THE RUBBER AGE AND TIRE NEWS

JUNE 10, 1920 VOL. VII. NO. 5

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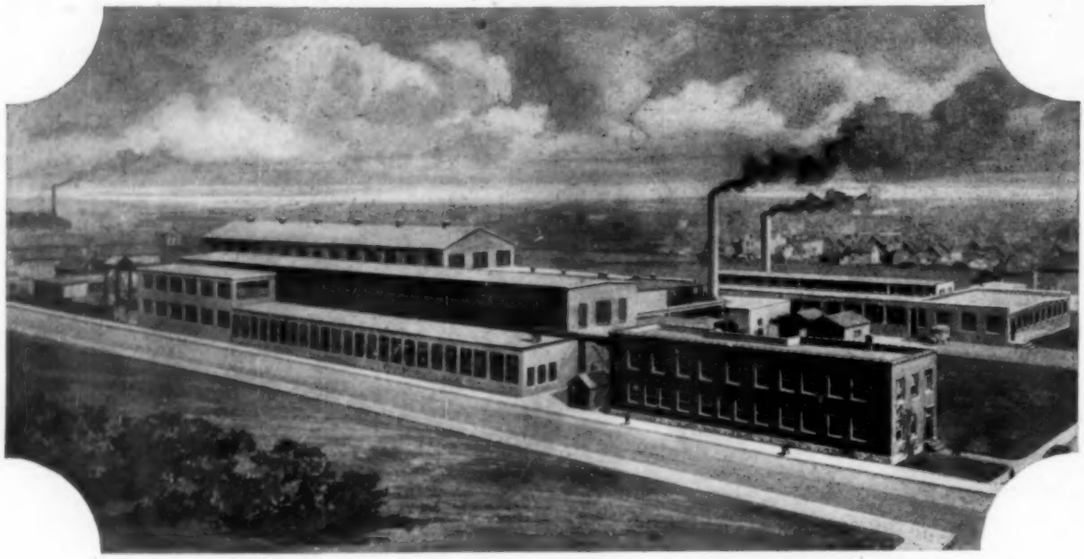

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A Library for the Rubber Industry

By Josephine A. Cushman

Associate Librarian, Municipal University of Akron

It is the purpose of this article to consider how a library may serve the rubber industry, some of the material available for such a library and the methods by which that material may be prepared for use.

The one group of literature most important to the rubber industry is that dealing with chemistry and physics, a knowledge of which is necessary at almost every step of the process of manufacture. The raw gums must be analyzed to show their chemical and physical properties and the result of this analysis determines the compounds that must be used with each gum. For instance, the presence of resins and proteins in raw rubber increases the speed of vulcanization and the amount of these substances indicates the proper proportions of accelerators and vulcanizing agents which must be used. The chemical and physical qualities possessed by the raw gums bear a direct relation, also, to the quality of cured rubber that can be made from them. By analysis, therefore, the gums are graded and their fitness for certain types of rubber goods are determined. Certain grades are used in goods requiring a high degree of elasticity, such as dental dam and rubber bands, while other grades are used in goods requiring strength and wearing qualities, such as belts and the treads on automobile tires.

Finally, the finished product must be tested to determine its suitabilty for the purpose for which it was designed. Insulated wire battery jars, and other goods coming in contact with electric currents must be studied for the electrochemical and electrophysical reactions. Goods designed to be used with chemicals, or for surgical, dental, or similar purposes, must be watched for chemical reactions which may be harmful or beneficial. The textiles entering into the manufacture of many rubber articles bring in physical problems of their own, while the making of synthetic rubber and the reclaiming of old rubber are, also, largely chemical processes and the objects of much investigation.

The examples noted above are but a few of the chemical and physical problems arising in the manufacture of rubber. The fact that rubber is a chemical substance and the process of vulcanization as a chemical process is little understood as yet makes experimentation and research work more important in this industry than in many other kinds of manufacture.

Aside from the problems occurring in the manufacture of rubber there are many points in the cultivation and preliminary treatment of the gum which it is the province of the manufacturer to know, since they affect the quality of the raw material which he must use. These embrace the chemical and physical qualities of the latex produced from different plants and the effect resulting from the different methods of cultivation and preparation. They do not concern the manufacturer so much as the problems within his own domain but he should understand enough of them to know what producers furnish the gums best suited to his needs, to know the methods by which any particular excellencies in a given product are secured, and to be able, as well, to keep track of the adoption by other producers of those methods. There is a great deal of experimentation carried on by the rubber growers and since plantation rubber is now upon a firm footing, constant progress in the improvement of raw material may be expected.

THERE are in Akron about thirty rubber manufacturing companies, large and small. The three largest, Goodrich, Goodyear, and Firestone, all maintain three library collections, a technical collection, for laboratory use, a general library for the offices and a factory library in charge of trained librarians. In spite of these facilities it is often necessary to go to New York or Washington for some important study which cannot be gathered from the Akron or Cleveland libraries.

The Akron public library is small and has little technical literature. The Muncipal University of Akron has a good, though small, working collection of technical matter but the demands of the students make it impossible to give but limited service without its walls.

The Municipal University has, however, expressed its willingness to give housing facilities to a central technical library supported jointly by the University and the various rubber manufacturing firms. This article is an elaboration of that idea.

The technical literature applicable to the rubber industry is large in amount and scattered throughout almost the whole field of chemical and physical publications. There is but little of it to be found in books, for the very reason that industrial science is a live subject and progress in it so rapid that books are out of date before they are published. There are, however some volumes which will be found useful. These include works on the production, chemistry and manufacture of rubber, as well as a few on chemistry itself, particularly in its physical, organic and collodial phases.

There are some trade journals devoted to the rubber industry, several in English and German and one in French. Aside from these, several journals devoted to the various chemical and allied trades will prove useful.

By far the most important group of material for the rubber chemist is to found in the scientific journals and the publication of the scientific societies. The number of titles in this group runs very high, there being over two hundred periodicals covering various fields of chemistry which one might expect to find useful to the rubber chemist. They include many in foreign languages. Most of these are in German but there are a great number, also, in French, Italian, Dutch and the Scandinavian languages. It is possible that the trend of affairs following the recent war will build up such a body of chemical literature in English as to make the foreign journals of relatively less importance than hitherto. Until

that condition occurs, however, a considerable number of foreign ones will be found indispensable.

Since the best key to this mass of literature is to be found in the abstract journals, it should be the first concern of the library to buy all of these which can be of service. Abstract journals serve two great ends. They save the investigator the necessity of reading a mass of material irrelevant to his needs and often in a brief summary of an article furnish all the information necessary. They, also, refer the librarian to material in his own collection that is needed and suggest to him further purchases to make. The most important abstract journal is the Chemical Abstracts, but there are many others which are devoted in whole or in part to abstracts covering general or specific fields and several of these should eventually be obtained as supplementary aids.

Collection of Scientific Journals

In building up a collection of scientific journals such as would be needed in the library under discussion the general policy should be to buy the most useful first. Subscriptions should be made to all the journals that, from previous experience, were known to be useful or, after careful investigation, promised to be so. The next step would be to build back in the most important sets for the period of the activity of the rubber industry, not hesitating to buy, parts of sets where this could be done to advantage. For instance, the editorial policy of a journal may have been such that in a certain series of years it has given space to subjects of interest to the rubber chemist, and then has changed to another line of investigation. If such a fact could be ascertained from abstracts or otherwise, the volumes valuable to the library could be bought and the others disregarded, thus saving money and shelf room.

Aside from the classes of material named there is a smaller group of national and state documents which would be useful. Among the United States publications the most fruitful for the chemist are the publications of the Bureau of Standards, which makes certain physical and chemical tests upon materials bought for the government, and for private concerns and individuals when so requested. Other departments issue occasional articles of interest to the rubber manufacturer. For example, one of the bulletins of the Labor Statistics Bureau deals with industrial poisons in the rubber industry, while one of the Public Health Service describes an investigation into the composition of the gum used in nursing nipples. These publications can be obtained free or at small cost, and by checking the Monthly Catalog of Government Documents it is possible to select useful titles without burdening the shelves with irrelevant matreial.

The Subject of Plantation Rubber

There are some periodicals and many government documents available on the subject of rubber production on the plantation. Almost every rubber producing country is now establishing experiment stations for the study of the problems of the cultivation of the tree and the treatment of the later. British India, Ceylon and Dutch East Indies rank first in their efforts along this line. The Kuala Lampur Agricultural Experiment Station of the Federated Malay States is doing the most notable work in the investigation of the method of treating the latex and its bulletin is, therefore, of great value to the manufacturer. The British government through its Board of Scientific Advice for India and its Imperial Institute lends assistance to the British experiment stations in their agricultural and industrial researches. For this reason the publication of these two bodies are also valuable reference material. The U. S. Experiment Station Record abstracts a large number of foreign as well as national agricultural journals and government publications including a great many articles on rubber. These abstracts cover many analyses of the latex and occasional articles of interest to rubber chemistry and manufacture. By subscribing to the Federated Malay State Bulletin and the Experiment Station Record the library can have available the best of this material for immediate use and be able to locate and determine the value of the more scattered articles from other stations which can then be obtained if deemed of sufficient importance.

Aside from those of chemistry and physics another class of problems which confronts the rubber manufacturer is that of mechanical engineering. There necessarily occurs in any manufacturing establishment which uses machinery the need of keeping that machinery in order. Then, too, the necessity often arises for designing machinery to produce a new article or to meet new specifications or to produce at lower cost than is done by that in present use. To be of aid in this work the library should include material on mechanical engineering. For this purpose there should be some of the better technical and trade journals on this subject. Trade catalogs and patent lists will also be required. Trade catalogs may be used to keep in touch with machines already on the market and to suggest designs for those which must be created, while patent lists serve much the same ends. The latter are sometimes found in technical periodicals, as the Journal of the Society of Chemical Industry, as well as in the Patent Office Gazette of the U. S. government and similar publications of other countries.

In common with all manufacturing this industry faces a large group of problems which may be loosely classified under the head of business management. Here occur factory administration, efficiency methods, business finance, credits and collections, accounting, labor and many others. There are a great many books on these subjects, not all of the highest character. The library must therefore choose from a considerable amount of literature the particular works which can be helpful to its clientele. In general the few periodicals covering this field will be found more useful than many books largely because their material is more up to date.

Labor Legislation

Among the problems listed above, that of labor assumes a leading position. It is ever present and is possessed of many phases, only a few of which will be touched upon here. The manufacturer needs to know the legislation in force which may affect conditions of labor in the United States at large and in each state in which he operates, as well as in any foreign countries in which he is an employer of labor. For this purpose codes of labor legislation and failing these revised statutes of the various legislative units should be on file in his library.

Perhaps one of the most important phases of the labor question which is concerning manufacturers today, especially those with large plants employing a great many workers, is that which is commonly termed welfare work. This includes all measures taken by employers for the comfort and contentment of the employee with the idea of increasing his loyalty and efficiency. These measures comprise the housing projects, whether allotments, dormitories or other forms, restaurants, cafeterias, club-houses, hospitals and the like. A comparison of the methods in this work pursued by any one firm with those used by others cannot but be useful, and for this purpose there are available articles in popular and architectural magazines, reports and descriptive material issued by industrial houses, and house organs of various sorts.

Commercial Collection

The last class of problems which will be considered from the point of view of the library is that of trade relations. This subject is of scarcely less importance today in the light of the broadening opportunities which the close of the war is opening up to American business than are the technical processes of manufacture. New markets lie ready for development all over the world, in South America, in Africa, in Asia and the Near East, as well as in more developed countries. American rubber manufacturers are, today, probably better prepared to avail themselves of these markets than firms in any other country, but this does not mean that they can escape a spirited competition. The war has developed rather than curtailed the demand for rubber manufactures. Great Britain and the Netherlands, between them, practically control the production of plantation rubber. It is only natural that they should turn to its manufacture. The American manufacturer cannot afford to neglect any means which will enable him to secure his share of the world markets and meet the competition with which he will be brought face to face. The library can be of inestimable value at this point in bringing together the best material available on trade conditions. The collection should contain a few choice titles on the theory of trade, foreign and domestic. There will be a place, too, for many works which will set forth the trade customs, demands, economic conditions

and financial systems of those countries with which trade is sought or maintained. Transportation is another topic of vital importance to the exporter which should be represented in the collection. So, too, is the subject of tariff schedules in the various countries, and any international labor regulations which may come out of the peace settlement. This material will be found in books, periodicals on trade and commerce, government trade statistics and commerce reports, bank statements, and the publications of trade associations. Nearly every country publishes some sort of year book or statistical abstract which can be used for general reference and which can be supplemented, as desired, by more detailed financial and trade statistics. The consular reports of the United States and the leading European countries will be found exceedingly useful. Great Britain and Germany publish very excellent consular and trade reports, which should inform the American manufacturer of methods followed by those countries in satisfying the whims of the trade. The publications of the Pan American Union, which is devoted to the purpose of creating sympathetic understanding and satisfactory trade relations between the United States and Latin America, also have a large contribution to make. Such organizations as the Chamber of Commerce of the United States, the Guaranty Trust Company, and the National City Bank of New York publish material on varying phases of trade and commerce. In addition to the problems of foreign trade are the multitudinous ones of domestic trade. Here come in branch organization, selling methods, advertising and the like. With the exception of advertising, which has developed a specialized literature of its own, these subjects overlap at many points those of foreign trade and business administration. With advertising, as with the latter subject, the most valuable material is found in periodicals, books being apt to be either too theoretical too faddy or out of date by the time they appear. The literature in the commercial field is large in amount and varied in character. Much of it can be obtained free or at small cost, and much of it is of temporary value only, being quickly out-dated. This is an advantage to the library as it is not required to house so large a number of volumes.

Administration of the Library

The gathering of books and periodicals is but half of a library's function. So administering its collection that it may be easily and readily available to the man who wishes to use it is of equal if not greater importance. In fact, a library can often make available to its patrons material which it does not itself possess.

The methods of service employed by any library must be worked out with regard to its own peculiar conditions, and but few general principles can be laid down. Such cataloging and indexing must be done as will help those who use the library, both librarian and patrons, to find the information they want with the least possible expenditure of time and effort. Printed indexes should be utilized wherever possible and such other indexing done within the library as is needed. In the use of these indexes the problem of timeliness arises. As it is often impracticable to wait for them to be published, even where they serve every purpose necessary, some means must be found to supply the need for them before they are issued. A method which is practised in a number of industrial libraries and which seems to give satisfaction wherever tried is that of compiling periodically, once a month, or once a week, as may seem desirable, an annotated list of articles in the current numbers of periodicals and like material which may be useful. Such a list is usually prepared in conjunction with a card index for the same articles which is kept in the library as a reference file. It may be checked over with the indexes and abstract journals as they arrive and weeded out of entries duplicated therein, leaving a permanent index covering the stray periodical articles which have escaped the general indexes or which have been treated in them from another point of view, and for publications such as foreign government documents which are not elsewhere indexed.

The practice of keeping and indexing clippings and the methods used if such a policy is decided upon must also depend upon practical considerations of time, expense and administrative policy.

There is one type of reference service which should have a large use in such a library as the one under consideration. That is photograph service. It should be extremely useful during the early years of the building up of the collection. If from the examination of the abstracts or other reference aids it is found that a valuable article exists, which is not on the shelves of the library, it is possible to send to another library owning the material and procure a photograph of the pages needed. Photograph copies can often be obtained where a direct loan of the book cannot be secured owing to the value, or, more often, to the constant use of the material in the library owning it. This sort of service is maintained by several of the large libraries of the country, notably the John Crerar Library of Chicago, and the Library of Congress. Such a service as this might be depended upon to supply occasional articles in series not otherwise valuable when separate issues could not be obtained. This type of interlibrary service could sometimes be supplemented by direct loan where another library could spare the material desired. Here again, John Crerar and the Library of Congress are to be noted as giving this kind of service, though almost any library is willing to loan material which it is not constantly using.

For local rapid service the telephone is invaluable and it is entirely probable that new methods will be found for the use of this instrument. It might sometime be possible to effect a combination of the dictaphone and the telephone.

Aside from the forms of service which aim particularly to get the material to the user, the library should give great help in working out lists of references on desired subjects, thus putting before the investigator all there is available on any subject. In this kind of work it can draw on the resources of other libraries as well as its own.

Organization of the Library

Library service for the rubber industry can be maintained in several different ways. In the development of the movement in the Middle West the present condition is one of private libraries built up and maintained by each firm for itself. In some cases these private libraries are divided into separate collections, such as technical and general, individually housed and administered for different departments.

Another method that can be practised where there is a large natural center for the industry is the banding together of the firms of the district for the maintenance of a central library. The Middle Western group of rubber factories, centering in Akron, Ohio, with the twenty or thirty firms there located and the fringe of firms in nearby towns, offers an ideal condition for the working out of such a scheme. Cooperative undertakings of this nature have been successfully maintained by other industries under less favorable conditions.

There are several advantages accruing from a central reference library that cannot be derived from smaller ones privately owned and maintained, however good they may be. The most obvious of these is the greater completeness of the collection. This results from the larger funds and the more liberal housing facilities possessed by the central library as well as from the greater economy in the purchase of books and in administration possible to it. Several firms, each contributing an amount smaller than needed for the maintenance of a library of its own, could secure to a central library a sum larger than that usually spent by any one firm on its own collection. With these larger funds the central organization could buy more economically than the small one. Orders could be consolidated and freight charges cut, while better second hand and special prices could be secured. In addition a large library always attracts to itself more free and gift material of value than the small one.

Housing Facilities

A central library would have a further advantage over the private collection in the matter of housing facilities. Any library established within the walls of a factory can afford to house only the best and by no means all of the material that would be valuable to the industry which it serves. A central organization would necessarily be located in a building or rooms of its own and could plan for future growth. The requirements of the collection would determine the size of the quarters occupied while otherwise the space available for library purposes would fix the size of the collection.

The central library owing to its nature and the larger funds which it would possess would be able to give service to its patrons far beyond what could be done by those privately maintained. A larger staff could be employed at a smaller expense to each contributing firm. Through a larger initial expense, certain devices, such as the photostat or cameragraph, for instance, could be installed which would reduce the cost of further service to a marked degree. Such measures would be justified by the larger service given by the central library where they would not be so justified in the small private one.

A cooperative scheme of the nature outlined would make possible to the small firm, at a cost which it would find within its means, a library service which it could not otherwise secure. The large firm, on the other hand, demanding a more extensive and immediate service, would be able to reduce the library within its plant to a minimum working collection and to depend on the central institution for a great deal which it must now furnish for itself, at the same time receiving additional service which its own library could not under any circumstances give it.

Under the present system each firm must buy certain journals for a rather occasional use, as well as others which are used every day. If a central library existed it would be necessary to buy only the latter. If there was an excessive loan demand on any piece of literature belonging to the main collection, photograph copies, either made by the central institution or secured from other sources, could be put into circulation to fill the need. This photograph material would become a permanent possession of the central library, to be kept on file by it or to be sent to the different firms for such periods of time as it was needed by them.

Reduction of Files

The firm library would not only not find it necessary to buy certain material it now purchases, but it would be able to reduce its files of back periodicals. The business library does not ordinarily house any more journal files than is absolutely necessary, thereby often depriving itself of material it might later use, but in spite of this fact it finds it necessary to keep volumes which may contain material not often enough used to justify its preservation if it were elsewhere available. The same principle holds true whether these back periodicals are saved as bound volumes or are preserved as clippings or separate articles.

In addition to the reduction in the size of the collection the central library would decrease the amount of routine work done by the private ones. The latter could depend on the central organization for nearly all its indexing. A magazine digest or index printed or mimeographed could be issued to each member firm at stated intervals and be utilized by it as a permanent index. To serve this double purpose this might be issued in both sheet and card form from the outset. An index so acquired by the firm would cover not only its own working collection but also the larger collection belonging to the central library.

Certain firms having producing or selling agencies widely scattered in location have so organized their library systems that one centrally located agency, usually the general offices or the largest producing plant, does all the book buying, cataloging and preparing for the shelves for the whole system. This principle has a wide application in the administration of public library branches and university departmental libraries. There is no reason why such a policy might not be adopted by the library under discussion, thereby developing a true library system, having at its head an institution possessing a large well stocked storehouse of books, and using the best approved and most successful methods of administration and supplemented by small working collections within those factories which require more immediate service.

A library for the rubber industry such as is outlined above would make an endeavor to collect all the material available which might be useful to the industry and to preserve permanently all that might be expected, even remotely, to be of any future value. Its collection would cover all of the various classes of literature needed by any department from the experimental laboratory to the branch office and foreign agent. Up to date methods of organization and administration would make it possible to furnish complete, accurate, and immediate service to its patrons. The firms supporting it would receive the advantages of the large reference library without sacrificing those of the small and conveniently located office, factory or laboratory library.

APPENDIX I.

Thirty five scientific and technical journals on chemistry and physics useful to the rubber industry from which first purchases are recommended.

Analyst.
Annalen der Chemie.
Annalen der Physik.
Annales Chimiques Analytiques
Annali di Chimica Applicata
Archiv der Pharmazie.
Berichte der Deutschen Gesellschaft.
Berichte des St. Petersburger Polytechnischen Instituts des Kaisers Peter des Grossen.
Bulletin de Societe Chimique de France.
Chemiker Zeitung.
Chemisch Weekblad.
Chemische Revue ueber die Fett und Harz-Industrie.
Chimie et Industrie.
Comptes Rendus.
Journal de Chimie Physique.
Journal der Russischen Physikalisch-Chemischen Gesellschaft.
Journal of Industrial and Engineering Chemistry.
Journal of Physical Chemistry.
Journal of the American Chemical Society.
Journal of the Chemical Society, London.
Journal of the Society of Chemical Industry.
Kolloid Zeitschrift.
Kolloid Chemische Beihefte.
Kunststoffe.
Metallurgical and Chemical Engineering.
Pharmazeutische Zentralhalle.
Physical review.
Recueil des Travaux Chimiques.
Revue General de Chimie Pure et Appliquee.
Zeitschrift fur Angewandte Chemie.
Zeitschrift fur Anorganische Chemie.
Zeitschrift fur Chemie und Industrie der Kolloide.
(Succeeded by Kolloid Zeitschrift above.)
Zeitschrift fur Physikalische Chemie.
Pharmazeutische Zeitung.

This list has been compiled from a study of five abstract journals: Chemical Abstracts, Chemisches Zentralblatt, Journal of the Chemical Society of London, Jahresbericht uber die Fortschritte der Chemie, (Liebig and Kopp), and Jahresbericht uber die Leistungen der Chemischen Technologie, (Wagner).

APPENDIX II.

The following are among the more valuable of the government publications on the cultivation and preliminary treatment of rubber.

Federated Malay States. Bulletin of the Kuala Lampur Experiment Station.
Covers agricultural and chemical articles. Abstracted in the Chemical Abstracts.

Great Britain. Board of Scientific Advice for India. Annual Report.
Covers the investigations carried on by the Board. Has some articles on analysis of latex.

Breat Britain. Imperial Institute. Bulletin, (quarterly).
Occasional articles on rubber cultivation and curing problems.

Burma. Department of Agriculture. Bulletin.
Occasional numbers have articles on cultivation diseases and tapping of the Hevea tree.

Ceylon. Department of Agriculture. Bulletin.
Frequent numbers have articles on vulcanization and agricultural methods.

Netherlands. Dept. of Agriculture, Trade and Industry. Medeelingen over Rubber.
Abstracted in Chemical Abstracts.

Dutch East Indies. Verslag omtrent den Staat van het Algemeen Proefstation te Salitiga.
Occasional articles on rubber.

Dutch East Indies. Verslag omtrent de te Buitenzog Gevestigde. Technische Afdeelingen (van het Dept. van Landbouw).
Contains reports of the work done by the Agricultur Chemisch Laboratorium and the Gouvernements Guttapercha Onderneming.

Dutch East Indies. Department of Agriculture. Jaarboek.
Reports work done by the Agricultur Chemisch Laboratorium, the Gouvernements Guttapercha Onderneming te Tjipetin and the Gouvernements Canotchouc Onderneming te Langsa.

Dutch Guina. Department of Agriculture. Bulletin.
Frequent numbers have articles on Hevea, tapping practices and diseases. The government has an experiment field at Domburg.

Vulcanizing and Catalysors

S. J. Peachy takes the view opposite ta that of Twiss, who claims that a relation exists between the basity of a compound and its accelerating power. The activity of a substance as an accelerator of vulcanization is not dependent on its basity.

Dimethylaniline. Dissociation constant $K = 2{,}4 \times 10^{-10}$ has on accelerating power although it is a more energetic base than paranitroso-dimethylaniline, $K = 1{,}9 \times 10^{-10}$.

Para nitrosophenol and its homologues show decided acid characteristics and acts as an accelerator of vulcanization.

Para amido phenol, in which the nitroso groups are replaced by amino groups shows no appreciable accelerating effect.

Finally while the nitroso bodies are energetic accelerators the isometric nitrosamines have no accelerating power.

The Colloidal Viewpoint of Rubber Chemistry*

By Ellwood B. Spear

Chemical Department, Massachusetts Institute of Technology

This article does not purport to bring forward any new facts concerning rubber, nor does it aim to minimize in the slightest degree the importance of pure chemistry as applied to the science or technical practice of the rubber industry. It has been written in the hope that it may help in a better understanding of some of the problems encountered in this field.

The paper is divided into two main topics. The first is an analysis of the mechanism by which the particles increase or decrease in size in rubber and other colloidal systems. Under this head crystallization, condensation, polymerization and coagulation will be discussed. The second topic is concerned with some applications of selective adsorption to rubber.

For the present purpose little need be said of the process known as crystallization except with regard to a single phase of this phenomenon. For instance, when very dilute solutions of gold chloride are treated with weak reducing agents a microscopic nuclei are formed from which colloidal crystals of gold made be made to grow, if the reducing action is kept sufficiently low, so that the molecules of gold have time to become orientated on the crystal faces. Here the growth of the particles occurs by a purely crystallization process, and will cease as soon as the supply of molecular gold or reducing agent is exhausted.

Condensation

The term condensation is often employed in a somewhat loose sense. Strictly speaking it refers to an increase in the size of the particles through the agency of a chemical change, whereby two or more molecules unite by the splitting off of water or other substance. A classical example is the formation of starch from sugar according to the equation

$$n\ C_6H_{12}O_6 \longrightarrow (C_6H_{10}O_5)_n + nH_2O$$

Polymerization is another well known method involving the growth of particles. This phenomenon differs from condensation only by the fact that nothing is split off when two or more molecules unite to form a larger complex. The molecular weight of the complex is, therefore, n times that of the original substance if n represents the number of molecules that have united to form the new and larger unit. Organic chemistry is replete with examples of this kind of chemical action. For instance the change of the aldehydes into the para or meta modifications belongs in this category. From the evidence at hand it seems very probable that in polymerization the redistribution of major valencies is involved, because those substances which exhibit this property to a pronounced degree are possessed of double bonds.

It should be emphasized in connection with a discussion of condensation and polymerization that these two types of changes are essentially chemical in the strictest sense of the term. The products of these two reactions have properties very different from the original, and the alterations of properties are sudden, not gradual.

Coagulation

Coagulation, in contradistinction to condensation or polymerization, involves a gradual change of properties and there is no sharp line of demarcation between the original and the final substance. Unfortunately, the term is employed to designate four distinctly different physical processes.

The first of these is well illustrated by the union of the colloidal gold crystals referred to in a previous paragraph. If during the growth of these tiny crystals the process is hurried, or if an electrolyte is added to the colloidal solution, several of the tiny crystals unite by surface contact, a loose mass is formed and eventually a powder will be precipitated. This is ,of course, an irreversible process and is a typical example of coagulation. It should be noted, however ,that the particles touch the surface of one another and do not flow together.

A second form of coagulation is manifested when, for example, the particles of an oil-in water system gather together. Here the tiny droplets touch one another, flow into a larger drop which finally rises to the top or sinks to the bottom according to the differences in the specific gravity of the two phases. This kind of coagulation is distinguished from all others in that the resulting products are two distinct, molecularly dispersed and therefore homogeneous phases. There is no colloidal oil dispersed in the water, not yet is there any colloidal water in the oil.

A third type is exemplified by the coagulation of gelatin in a hydrosol by an excess of an electrolyte, whereby a flocculent and perhaps a somewhat stringy mass is obtained. It is conceded by most writers that the electrolyte to a large extent desolvates the gelatin, that the particles are at first actually reduced in size because of the loss of solvent, but that the desolvated particles unite to form larger clumps which appear as flocks.

Another Possibility

There is also another possibility that should not be overlooked. Not only may the particles unite and flow together, but the molecules of which these particles are composed may unite chemically to some extent and form a polymerized substance. In such a case we should have both a chemical and physical reaction going on simultaneously or subsequently to each other. It is altogether probable that in the coagulation of rubber latex where an elastic mass is formed, both a physical union between the particles and polymerization between the molecules in these particles occurs. It is quite conceivable that these two reactions might proceed to a different degree in the same system under slightly different conditions. If this were true we should not expect the two products to have identical properties. This may explain why two samples of raw rubber from the same latex may differ materially from each other if the conditions during coagulation are varied in the two cases.

A fourth physical change, that of gelation, is usually referred to as coagulation. When a sufficiently concentrated solution of gelatin in water is allowed to cool the entire mass sets as a gel. The process in this case is the reverse of number three previously described. As the cooling proceeds the particles become more and more solvated, the size of the particles increases until they touch one another and the gelatin eventually forms the continuous phase, while the water is now dispersed in the gelatin. This phenomenon is known as a reversal of phase. Gels may be formed, of course, by evaporating off the solvent and here again the same reversal of phase may occur. It is also not impossible that polymerization may take place during the formation of a gel by either of these processes.

Characteristics of Gelation

Gelation differs from the three previously mentioned forms of coagulation because in a gel both the disperse phase and the disperse medium are co-extensive throughout the entire mass. This expression is employed in preference to the term homogeneous because the latter has a well defined thermodynamic meaning. Homogeneous solutions contain a solute in a molecular state of subdivision and exhibit a lowering of the freezing point or raising of the boiling point from which molecular weights may be calculated. Gels are co-extensive in the sense that every submicroscopic portion contains both the solute and the solvent.

The coagulation of raw rubber from the latex has already been discussed. Caoutchouc dissolved in benzol may be separated from the solvent either by the addition of acetone or by the evaporation of the benzol. In the first case a lumpy, stringy mass is obtained doubtless because of the acetone desolvates the raw rubber. In other words the acetone robs the caoutchouc of its benzol, the particles are attracted to one another and therefore coagulate in masses or flocks. When, however, the benzol is removed slowly by evaporation the particles are forced closer and closer together as desolvation proceeds. Finally they touch, flow into one another and a

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single co-extensive mass is formed. Just as in the case of gelatin it is quite possible that polymerization occurs during the coagulation.

In accordance with this point of view an elastic rubber mass is a coagulum permeated with capillaries, the walls of which are made up of more or less polymerized particles of different sizes stuck together at several portions of their surfaces. If a solvent is introduced the particles become solvated and separate into submicrons that differ greatly in size. Moreover if polymerization occurs during coagulation it naturally follows that depolymerization must take place while dissolution is in progress.

This same increase in dispersion and possibly depolymerization may be brought about by other agencies than solvents. Mechanical work and rise of temperature have this effect to a marked degree. Doubtless the function of "milling" is precisely of this nature, but whether the paramount change is chemical depolymerization or merely a physical reduction in the size of the particles cannot be decided at present. It seems very probable that both occur at the same time. It is of interest to note in this connection that a tire on the road is being constantly subjected to a milling treatment which should tend to depolymerize and decrease the size of the particles. This effect should be offset wholly or in part by a slow vulcanization in case free sulphur is present, because the temperature rise in a tire under load is often very considerable.

The subject of coagulation and the antithesis, dispersion, should not be dismissed without reference to the important part these reactions play in the preparation of such compounding materials as zinc oxide, gas black and sublimed lead. A recent article on carbon black by Perrott and Thiessen.* makes it quite clear that not only the size of the particles but also the structure is vital. Both of these are without doubt influenced by the method of preparation.

Selective adsorption, the second topic of this paper, is a colloidal conception that promises to become more and more useful as it is better understood. By the term is meant, of course, that certain substances mutually attract each other with very considerable force, although no chemical action according to the law of Definite Proportions may result. When the substances are microscopic in size this attraction is called adhesion, but if one or both are of colloidal dimensions the term adsorption is applied. May it not be that this phenomenon is the vital factor in the compounding of rubber? Certainly on purely chemical grounds we cannot account for the very great change of properties occasioned by the mixing of gas black with raw rubber, nor yet for the fact that oil black is not so efficacious as gas black. Selective adsorption on the other hand, predicts very pronounced differences of behavior between substances having the identical chemical composition but a different physical structure. In order that carbon black may be adsorbed by raw rubber to the greatest degree and with the strongest bonds, the former must be in a very fine state of division, and doubtless the particles must have a particular structure. These conditions are not met so well by the oil black as they are by the gas black.

This theory also predicts other important facts familiar to the rubber chemist. For example it ought to be possible to substitute for carbon other substances which are in a suitable physical state. The determining factor is whether or not the compounding material and rubber mutually adsorb each other to a high degree. This is doubtless the reason that zinc oxide may be employed instead of gas black.

Many other systems are known where mutual adsorption changes the properties fundamentally. As an instance may be cited a mixture of sand and mud, or clay. Roads made of either of these materials alone are nearly impassible, but if the two are mixed in the right proportions very fair surfaces result.

This article will be concluded with a brief word picture from the colloidal point of view of a compounded vulcanized rubber mass. The particles of the compounding material are surrounded by a thin film of rubber. The latter is therefore the continuous phase and is held securely to the surface of the compounding material by the forces of adsorption. Not only will the rubber films offer resistance to efforts tending to deform the mass, but the particles of the compounding material hold the films of the rubber so firmly that the resistance is greatly increased. A good example of this last action is shown by the surfaces of two glass plates which have been wet and brought together. As long as the plates are not very close they can be moved across each other with ease. When, however, the surfaces are pressed together so that the water forms a thin film between them, the adsorption forces become so strong that the plates may be moved in different directions only with great difficulty.

* Jour. Indus. & Eng. Chem. XII. 324 (1920)

The Viscosity of Rubber Solutions*

This paper takes up the following subjects: 1. General remarks on the determination of viscosity. II. Various methods for measuring viscosity. III. Methods for the determination of viscosity.

The following method was used: about one gram of the finely cut up rubber sample is placed in a hollow flask and shaken on the machine with 100cc chemically pure benzol, boiling point 80°C, until the rubber is about 80 per cent dissolved. The solution is filtered through glass wool and the viscosity measured in Ostwald's viscosimeter, of the Fol type, at constant temperature, in diffused light. The first number is taken as the basis. The test is repeated in order to guard against errors. This always shows low values. The time taken to flow out divided by the time taken to flow out of pure benzol gives the relative viscosity. The concentration was determined by evaporating 25cc of the solution.

IV. Influence of the agitation on the viscosity of the rubber solution.

V. Influence of the light and of the discharge through a capillary on the viscosity of rubber solutions. It is recommended that the work be carried out in a subdued light and to use the first observation of the viscosity.

VI. Influence of moisture and of acid on the viscosity of rubber solutions. While water appears to play no great part in the determination, acid, even in traces, must be kept out for a correct determination.

VII. Influence of incomplete solution on the viscosity of rubber solutions. The resins are more easily soluble than the rubber, therefore, if the solution is not complete enough low viscosity numbers will be obtained, while if agitation is carried too far the nitrogen compounds dissolve and the viscosity is raised. In all cases the greatest part of the rubber must be dissolved otherwise the viscosity numbers must be taken with reservation.

VIII. Influence of the nature of the solvent on the viscosity of rubber solutions. It was found that the quotient of the relative viscosity of various rubbers for two different solvents is not constant that it is proportionally greater with rubbers having high viscosities than with those of less viscosity. It is therefore important that the same solvent should be used if a comparison is to be made.

IX. Influence of the resinous bodies on the viscosity of rubber solutions. Extracted rubber shows a less viscosity than crude rubber. This is not a fact which applies to all cases. The separation of the resin causes this diminution of the viscosity or it may be the extraction treatment. In any case it is not possible from a solution of the resins on the one hand and the extracted rubber on the other by mixing these to form a mixture in which the original viscosity is raised.

X. Influence of sulphur and compounds on the viscosity of rubber solutions. The simple mixing of sulphur and compounding materials does not change the viscosity. In the calculation it is only necessary to bear in mind the change of the concentration due to the compounding ingredients.

XI. The importance of the viscosity determination. There exists an actual relationship between the viscosity and the tensile strength. The viscosity also shows the important factors concerning the quality of the rubber.

XII. The measurement of the swelling power of the rubber gives valuable conclusions concerning the quality of the rubber. However, as yet, not enough work has been done on this property to give definite results. The swelling power is proportional to the viscosity.

Delft Rubber Laboratories.

Organizing an Employment Department*

This Article, which is the Second of a Series Devoted to the Employment or Personnel Department, Discusses the Relation of Employment Management and the Foreman. The Third Installment will Appear in an Early Issue

No plant that permits foremen to discharge workmen from the employ of the company has a functionalized employment department. This is crucial. No plant that permits foremen to practice upon workmen injustices that cause them to quit voluntarily may be said to have a successful employment department. The distinguishing mark of the employment department is that it is functionalized, that it does for all departments in a plant the things which otherwise would be done with varying success by individual foremen.

From the shoulders of the overloaded superintendent there have slipped down upon the foreman of the shops a mass of heterogenous functions. In establishments where the modern plan of functionalizing the foreman is unknown, each foreman is for his own shop a jack-of-all-trades, endeavoring to deal directly with the details of a great variety of duties. The inefficiency of such methods has been amply revealed by the analyses which have been made by the exponents of scientific management.

The remedy is specialization. This means that groups of related duties are put in the charge of special foremen or service departments, such as the stock clerk, the engineer in charge of repairs, the planning room experts, and the tool room clerk. From the foreman's point of view the employment manager is such another functionalized foreman.

The idea of withdrawing similar functions from a number of departments and concentrating them in the hands of a staff department, which deals with that function exclusively, is part of the modern development of industry. It has extended from engineering to sales, and thence to purchasing and stores keeping and, in factories under so-called management, to a much more detailed sub-division of operations, including planning, job setting, job analysis or time study, internal transportation, process development, etc.

In former times, not too remote in the recollection of men still actively on the job, each foreman did his own purchasing of supplies, and even of raw materials, because it was assumed that he knew best what he needed to run his department, and could best recognize values in material; yet the wastefulness of this method of playing up to the pride and self-sufficiency of foremen gradually led to its abandonment.

The centralization of purchase and stores obviously promotes the standardization of tools and supplies, the reduction of investment in stores (through the fact that a minimum of stock for three departments need not be so great in total as three separate minimums for as many departments), and the better and more prompt disposition of obsolete items.

Advantages of Centralizing

The advantage of centralizing the other functions mentioned comes from two main causes: First the fact that a number of functional foremen can give exclusive attention to one set of ideas only, and may develop into specialists, indeed, may be selected initially for special aptitudes; second, the fact that the same job done a number of times for many departments need not be repeated in all of its elements so many times unless as many different people do it. There is an absolute saving of time and mental energy, corresponding to the proportion of uniformity or "reuse" in a repetition of a job.

Functionalization, therefore, gets a job done more cheaply and more expertly. When a department foreman does his own stores keeping, his own buying, his own time keeping, his own job setting, his own maintenance supervision, his own rate setting or task work, his own planning, and, finally his own hiring and firing, it is obvious that he must be either a man of superlative abilitiy, misplaced as a foreman, or else that he must do some parts of his work badly.

By means of the centralization which employment management contemplates, the general shop foreman is relieved of hiring friends of employes in his own department who importune him for selected jobs merely on the basis of friendship and not fitness. He can ask for the transfer of unsatisfactory employes, but if enough of these transfers show that discarded persons are able to make good in another shop where foremanizing is different, he prepares a prima facie case against himself. The foreman gets a more even and dependable run of workmen from the employment department than he can provide for himself. And he is freed from many distractions to become an expert in shop manufacturing processes.

It is important to consider this question in the preliminary study of employment management because it is the one big obstacle in the way of the creation of a personnel department in any plant. The source of friction, even after the creation of such a department, is the feeling on the part of foremen that the employment manager is a meddler in their proper business.

Securing the Foreman's Cooperation

The employment manager must find a way to secure the enthusiastic cooperation of the foremen with whom he works, and to enlist their sympathy with the policies of the management, and of his own department, as if those policies were their own. The technique of installing an employment department, therefore, is largely a diplomatic procedure for overcoming resistance to the plan. The aim must be to take final responsibility for general policies with reference to human relations and specific control in certain critical junctures, such as employment, promotion, transfer, grievance adjustment, and discharge, away from foremen and superintendents without permitting them to feel belittled or checked in the performance of their proper duties. It is clear that this can not be done in a single day—at least with foremen and production men educated, in the old-school management. When the day arrives in which the majority of factory executives have had their experience in plants in which personnel service, or employment work is functionalized, there need be no more diplomacy about ordering foremen to accept the authority of the employment manager for labor conditions than about instructing him to follow blue prints furnished by the engineering department instead of making his own rough sketches. But until that day arrives it is almost an act of violence to take foremen unawares with a completely functionalized employment department, and tell them to pass to it a portion of their former authority over men.

Indeed, the first step of installation is to convince foremen that the employment department is not set up to deprive them of their authority over men. They will be stopped from exercising arbitrary and irresponsible authority, but they will still be the ones who transmit directions to the workmen, and who recommend measures for discipline of those that are inefficient or disobedient. Their hands will be upheld whenever it is at all possible; they will not be overruled in given instances so much as in a given type of action which is wrong. They will be helped by the employment manager so to conduct themselves toward the workmen that their own consciences will approve the policy.

Thus, in the matter of terminations, correct practice will be to have the foremen simply recommend the discharge, and leave to the employment manager, as a disinterested arbiter, the final "yes" or "no" of the recommendation. In the long run, the foremen will reach decisions which may be approved, and will thus quite definitely impress workmen both with their influence with "higher ups" and with their ability to reach decisions with which disinterested partes can agree. Surely this will increase, not minimize, the foremen's authority over their men. This is one of the actual aims in centralizing em-

* Federal Board of Vocational Education

ployment work. In referring decisions to the employment manager it is not a case of merely preferring one man's judgment to that of another. It is not merely to standardize the labor policy by having the individual impulses of all the foremen pass through the reconciling judgment of one dependable man, although that is one of the aims. It is not merely to assure justice to all workmen by having the heated and hasty decisions of foremen subjected to the review of a calmer and more disinterested person, although that is one of the aims, but it is quite as much to reenforce the authority and lend prestige to the judgment of foremen by showing that their decisions will stand the test of publicity and review.

Foremen Must Be Considered

That being the case, when installing a new employment department, managers, and especially employment managers, should keep in mind all three of these aims—not only the first two, but all three. Care must be taken not to be so anxious to standardize the labor policy and to assure justice to the workmen as to cut the foremen entirely out of the handling of men, and thus by making them feel that they have lost caste and power, actually lose it. It is much better gradually to secure the first two aims while always holding fast to the third one.

If foremen in any given plant now have final power to discharge workmen, it is wise to permit them to continue to exercise it until they can be convinced that they will suffer no deprivation in giving it up. The first step is to establish a turnover of labor record which indicates who is most successful with his men, and to give publicity to that record. The mere comparison will often produce gratifying results.

The next step is to inquire into each case of discharge and quitting, both by having the foreman report in writing, on a "quit slip," the reason for each separation, and by having the employment manager talk it over with the foreman. The next step, which may usually be taken concurrently with the second, is to have all men, discharged or quitting, see the employment manager before receiving their final pay. Many times, reasons will be given and stories related by the men which foremen may have heard but dared not set down in writing. Good judgment on the part of the employment manager may lead him at times to call the foreman in to check up some such story, and, while being careful not to let the foreman lose his face in the given instance, to so let it be known that here is a system of checking up as to cause the foreman to be more careful next time.

An effectual establishment of these policies will usually get the foreman into a state of mind where he may himself suggest that the employment manager talk with an unsatisfactory workman, and see if the foreman is not correct in his judgment that the plant would be better off without the man. When such instances begin to be frequent, there will be little opposition, but rather a general feeling of relief, of being backed up in a new and efficient policy, when the foremen are relieved of the care of preliminary selection in hiring, and of the final responsibility in discharge.

Functions Related to Discharge

That is not to say, of course, that discharge is the only thing that matters, but it does mean that if the foreman finds it necessary to square his judgment with the employment manager at the finish of his relations with a workman he must necessarily look to him also for some guidance from time to time short of the finish. It means, too, that in order to be properly advised in making final decisions the employment manager must know the foremen and the conditions surrounding their relations with their men. It implies the adjustment of grievances; and the department should at once put in a bureau of complaints and suggestions. It implies a share in discipline, for the department must now furnish part of the foremen's alibi for slack production, absenteeism, tardiness, etc.

It implies, too, a share in deciding on transfers and promotions, because punishment is negative, and discipline can best be effected by means of the positive influence of reward, or the hope of it. The employment manager will now need to put his individual efficiency record into service, and accumulate all the necessary data for deciding upon the merits of each worker's claim to promotion whether he asks for it or not. He will need to submit to the general manager a standard scheme for wage increases; he will need to classify his operations and indicate what is a feasible transfer from each operation, and what is the next step in promotion. This, in turn, suggests a more detailed and written description of each operation, generally called a "job specification." The job specification, of course, is designed primarily as an interviewer's aid in hiring men on foremen's requisitions, but probably it can be more easily dispensed with as an aid to interviewers than as an aid to whoever passes upon promotions and transfers.

The employment officer comes into a business organization as a staff man, to relieve the general executives. The general executive is a correlator. He is a balancer of claim against claim. His business is to define the general aims and to harmonize all lesser activities with them. To do this work well, he must be supplemented by specialists who do not have a wide range of functions, and so can concentrate upon some special phase and, upon demand, can furnish him with detailed knowledge and standardized special agencies.

First Class Men Necessary

The line executive in war determines where a battery shall go and what it shall do, but he depends upon staff men to breed a reliable artillery horse, to design convenient gun carriages, and to prepare service tables for sighting guns. In industry, the function of staff departments is already understood with reference to mechanical equipments. The general executive decides to construct a factory or a warehouse; but he depends upon an architect to design a building which will resist the probable stresses. He desires a product; but he organizes a designing department and an inspection department to control the dimensions of parts. He would not pretend to a mastery of all the sciences involved. The analogy between the function of the purchasing agent in a modern organization and that of the employment manager is close. Formerly, factory foremen thought they knew best how to purchase raw materials. The development of the purchasing agent proved the fallacy of this, since his testing laboratory and specialized knowledge made the results far superior to those obtained by the individual foremen. This principle of staff service is now being carried over into the field of human administration. General executives demand well-chosen men, men who are physically examined and pronounced safe for the work they are to do, men who are properly paid, and men who are so handled that they become permanent, contented, and loyal cooperators in the general plans of the enterprise. Of all the standardized agencies which a service department can put at the disposal of a general executive, the supreme one is a first-class man.

When it is recalled that the general superintendent of a modern factory is responsible for general supervision of the purchase, repair, and use of equipment; for the purchase, testing, storage, and accounting of materials; for shop schedules, promises of delivery, and measurement of output; for cost estimates ,inspection of product, tool accounting, and all production orders, it can readily be seen that he has little time or energy to consider the interests of the workers in other than a very general way. There is some excuse for his looking upon men as merely the tools of production. With such an administrative blockade already existing, even in small business, there has intervened in recent decades the enormous growth of American corporations. This growth has so overwhelmed executives with functions, and so regimented each class in industry by itself, that officers and wage earners have been swept apart, and the friendly elbow-touch of the earlier day of small shops entirely destroyed.

General Executives as Employment Managers

We should remove some of the grounds of controversy at once by several important admissions. We should allow, first, that oftentimes a plant that has no employment department at all handles its men well, and retains them. Such a plant was a nationally known establishment near Cincinnati, Ohio, which for thirty years had excellent management of men without utilizing an employment manager. But in this case, as in every similar case, the functions herein described as most vital to employment, or service, or personnel work—whatever it is called— were centrally administered by one executive bear-

ing another title but evidencing all the highest qualities of the employment manager. In this plant the superintendent for years gave his individual attention to the labor relations, bringing to their improvement a wisdom, a force, a sense of fair play, and a personality that assured the retention of a high class of workmen. Men of this sort are, to the extent of their influence, more valuable than institutions, and if there were only enough of them, and if they could only be perpetuated and properly distributed, we might dispense with many institutions. But institutions, however impersonal and unwieldy, are more dependable, on the average, than men. The modern employment department is an attempt at institutionalizing the work of exceptional men; and whatever its deficiencies, it has the merit that it can be reproduced at will, that it can be properly distributed, and that it can be as perpetual as a corporation. It is noteworthy that the company above referred to recently decided to perpetuate the idea of justice practiced by its superintendent by instituting an employment department to help him.

A second admission that may clear away controversy is of the truth of the assertion so often made that in every question of justice in factory relations there is a concomitant question of technical fact, and that a correct decision on the human phase of the problem is not possible at the hands of a person not experienced enough to settle the question of fact. This argument often supports the contention of production foremen that they should be permitted to exercise sole discretion in labor questions because they are especially familiar with the process involved. But the argument properly involves merely the caution not to intrust an employment department to a person totally unfamiliar with industry, or even to one who will not diligently add to general knowledge of industry a rapid comprehension of the processes in his own plant, and on top of that study the technical circumstances of every individual case. The employment manager can only succeed when he is supported by both superintendents and foremen and is so intimately introduced into the councils of his company that he can see the manner in which the personnel factor correlates with the other factors—money, machinery, materials, methods, and markets—in the practical policies of production. With such advantages the position of employment manager should be as favorable a stepping stone to the position of general manager as any other. We have already admitted that the best type of general manger is often, in a real sense, an employment manager. With proper knowledge of production, the best type of employment managers may reverse the equation and become general managers.

Adequate Executive Position

If the personnel problem in industry—the problem of labor administration—is a prime aspect of modern production, and if the adequate handling of it is a full man's job, then it follows that the employment manager must himself be no mere clerk either in personality or in administrative status. He must be a man of force, intelligence, and discretion. His place being coordinate in importance with that of the production superintendent, his qualities should be such as warrant his having equal standing with the other executives reporting to the general manager. Certainly he should have direct access to the chief plant executive and he should be coordinate in authority, function, and conference value with the production superintendent, the financial and accounting manager, the chief engineer, the sales manager, and the director of purchases. These six executives should, in every plant which operates as a complete unit, constitute a factory board under the chairmanship of the plant manager.

Indeed, there must be an interchange and coordination between the departments; and this is the chief duty of a plant manager to effect. The production department itself properly should come under the review of and accommodate itself to the point of view of the employment department in some respects and the employment department must accept the guidance of production in others. For instance, the production departments will requisition men, or order lay offs, and the employment department will have no authority to hire save on requisition. An exception in detail and not in principle appears when the employment department hires not for the factory but for the vestibule school, and the factory requisitions not the empoyment department but the school when it desires new men. The vestibule school is a kind of storage reservoir of prospective employes, and the number kept in the school is budgeted by the plant manager. But after the storage minimum is set up, a perpetual inventory is kept,and as the factory requisitions from the school, the employment department hires for the school.

There is an interrelation between the accounting and the employment departments which also is very close. The time-keeping and the cashier's departments affect the worker in important ways, and the employment department should be permitted to suggest means of improving the method of time keeping, and should largely determine the procedure for pay offs. The distribution of badges and locker keys, which is often a function of the cashier or paymaster, more properly belongs to the employment department, but if located here must be subject to the supervision of the cashier, both because of the responsibility for company property involved in badges and keys and because of the relation to the numbers of the clock cards.

Employment Management and Time Study

Time-study work, whether made a function of production, engineering, or development departments, is closely related to employment also, because on the accuracy of this work depends the whole structure of relative wages, base rates, job specifications, occupational fatigue studies, transfers, promotions, or what we might call "job justice," in contrast with the justice of general policies. So close is the connection indeed, that were the employment department as anxious to take over related functions as the production and the accounting departments are likely to be, it might with some color of reason demand that it take over the time-study work as an implicated responsibility. As it is, it would not be unreasonable to permit the employment department to engage a time-study man as a kind of final inspector of tasks, sending him out to retime any job of which workmen consistently complained. In many factories the employment department lacks even the means of ascertaining the facts, and has no recourse when it believes a job to have been set badly.

The production department has its responsibility to the employment department also through its inspection of work done, through its control of the tools given workmen, and through its planning of work, because, if a constant flow of material is not furnished, in economical runs, and if tools adequate to do the job in standard time are not furnished, and if the inspection is faulty either in the respect of passing castings that do not machine well, or in respect of permitting one workman to be charged with the error of another, the workman is aggrieved, and the employment department has a complaint to adjust or a new workman to hire.

On the other hand, the employment department has the responsibility of furnishing needed men promptly, of adequately training them, and of assuring their regular attendance, their good health, and their good will at work.

(To be continued)

Catalytic Acceleration of Vulcanizing*

It is not the constitution but the basity of the organic accelerator which is the essential factor for acceleration. If, however, many of the strongly basic compounds are not used it is either on account of some disagreeable property or its high price.

Concerning the nitrose bases these are not in general strong bases. They have however, the characteristic of being reduced by contact with organic substances when heated. From nitroso dimethylaniline is formed for example p. phenylenediamine. It appears also that this compound has an oxidizing effect on the rubber. This being the case the properties of the vulcanizate are reduced.

**K. Gottlot, Gummi Zeitung*

News from the Rubber Metropolis

Akron Firms Build in the West—Goodyear Declares Dividend—Troesch Sails for Europe—Akron Stock Prices—Miller Promotes Welfare Work—Mason Sales Increase

Akron Firms Build in the West

(Special Akron Correspondence)

Los Angeles may become the rubber center of the Pacific coast district, but it will never rival Akron as a rubber center.

This is the opinion of executives of local tire companies who have studied the trade situation in the west.

One Akron company, the Goodyear Tire & Rubber Co., already has opened a tire plant and fabric mill at Los Angeles. Another, the Firestone Tire & Rubber Co., has a site for a western factory in the California city. A third, the Miller Rubber Co., contemplates building a small tire plant there.

The plant of the Goodyear Company in Los Angeles got under way the first of June with about 1,000 employes, over one fourth of whom were sent there from the Akron factory. The formal opening of the factory is scheduled for June 15th. Executives from the Akron office will be present at that time. Los Angeles city officials are talking about making it a holiday in that city and celebrating the coming of rubber factories to the coast town with a parade and other ceremonies.

No announcement has come from the Firestone office as to just when the plant of that company will be built at Los Angeles.

Officials of the Miller Rubber Co. have announced their intention of opening a plant at Los Angeles within the coming year. The factory buildings will be located near the Goodyear plant, it is said, the Miller company having an option on this site as well as four other possible locations.

It is the plan of the Miller Rubber Co. to erect a factory which eventually will turn out 3,500 automobile tires a day. The cost will be approximately $1,000,000. F. C. Milhoff, general sales manager for Miller, has been in Los Angeles arranging for the location of the plant there.

Akron factories, it is pointed out, are unable to produce enough tires to fill the demand. A survey of the business, it is said, convinced the manufacturers that the best step would be to locate factories in the west to take care of all the business west of the Rocky Mountains. Los Angeles was chosen as the best site because of the proximity of the cotton fields, cheap water and the absence of labor troubles.

According to the surveys made, the Los Angeles plants will turn out about one-fourth as many tires as are made in the Akron factories of the three companies.

Goodyear Declares Dividend

(Special Akron Correspondence)

Need of additional financing, brought on by the restriction of credits at a time when transportation tie-ups forced manufacturers to carry huge stocks, led directors of the Goodyear Tire & Rubber Co. last month to declare a stock dividend of 150 per cent out of the $43,000,000 surplus fund of the company. In addition to the declaring of the stock dividend, the company also will sell $10,000,000 of common and $20,000,000 of preferred treasury stock which has been authorized but not issued.

When the refinancing is completed the company will have an outstanding capital of $128,557,250.

The total of the stock dividend is $31,133,250.

In explaining the action of the directors, F. A. Seiberling, president of the Goodyear company, issued the following statement:

"The business of The Goodyear Tire & Rubber Company, for the first six months of the present fiscal year, has been 59.5 per cent greater than the volume of business for the same period last year. The transportation difficulties have made it necessary for the company to carry a very much larger supply of materials of all kinds than would be necessary under normal conditions. This situation, in conjunction with the restriction of credits, has made it advisable for the company to do additional financing.

"The Company, over a period of years, has accumulated a surplus of approximately $43,000,000. In order to put out additional preferred stock it has become necessary, in order to comply with the statutes of Ohio, to put out additional common stock. The Directors of the Company, therefore, have capitalized a portion of the surplus of the Company by the declaration of a common stock divident of 150 per cent, payable to the common stockholders of record at the close of business June 14, 1920, and payable on July 1, 1920. The Directors have also authorized the Treasurer of the Company to offer to the stockholders $30,000,000 of the authorized but unissued capital stock of the Company, $10,000,000 thereof to be common capital stock and $20,000,000 thereof to be preferred capital stock, such stock to be sold as of June 15, 1920, to the stockholders at par for each two shares of preferred stock subscribed for, at par, stockholders to have the right to purchase one share of common stock at par.

"After this financing is consummated, the outstanding capital of the Company will be as follows: Preferred, $66,663,500.00; Common, $61,888,750.00.

Troesch Sails for Europe

(Special Akron Correspondence)

F. C. H. Troesch, export manager for the American Rubber & Tire Co., accompanied by his family, have sailed from New York for England. Mr. Troesch expects to cover practically all of Europe in the interests of his company.

Akron Stock Prices

(Special Akron Correspondence)

Announcement of the 150 per cent stock dividend and refinancing plans of the Goodyear Tire & Rubber Co. was accompanied by the drop in market quotations of Goodyear stocks which usually follows a step of that sort. For a few hours on the day of the announcement and the following one, Goodyear common shot upwards. A few buyers bid the common up fifteen points. The rise, however, was short-lived. The price dropped back eight points and then started to slide. Quotations on common fell twenty-five points within a week.

Generally speaking the rubber stock market still exhibits a tendency to resist the downward trend. To be sure the stocks are yielding a little, but no decided break has come in any stock other than Goodyear and that was occasioned by the stock dividend announcement. Investors, as a rule, usually expect more than is given in such melon-cuttings.

Following are the quotations on June 2:

	Bid	Asked
Amer. T. & R. com.	83	88
Amazon Rubber	...	98
Firestone com.	152	160
Firestone 6 per cent pfd.	91	92½
Firestone 7 per cent pfd.	92	93
General T. & R. com.	800	900
General pfd.	99	101
B. F. Goodrich com.	62	64
B. F. Goodrich pfd.	90½	91½
Goodrich 5-yr 7 per c't notes	95	95½
Goodyear com.	320	340
Goodyear pfd.	88	89
India Rubber com.	175	190
India Rubber pfd.	...	93
Mason com.	24	26
Mason pfd.	...	70
Marathon com.	...	50
Miller Rubber com.	160	168
Mohawk Rubber	...	300
Portage Rubber com.	...	85
Portage pfd.	...	80
Republic com.	2½	3
Republic 7 per cent pfd.	...	65
Republic 8 per cent pfd.	...	25
Rubber Products	...	110
Star Rubber com.	160	175
Star Rubber pfd.	...	100
Swinehart com.	...	75
*Swinehart pfd.	...	80
Phoenix Rubber com.	...	22½
Phoenix Rubber pfd.	...	90
Standard Tire com.	175	185
Standard Tire pfd.	...	90

*Ex. dividend.

Miller Promotes Welfare Work

Believing that the environment in which the factory worker finds himself is of great importance in building tires, officials of the Miller Rubber Company at Akron, Ohio, are doing everything possible to keep each worker healthy and happy.

For amusement and recreation there is an athletic association to promote sports and outings. There is a cafeteria where the employe meets officials on common ground across a dinner table and obtains food at the lowest possible cost. If ill, there is a modern hospital and skilled physician at his command without cost to him.

Mason Sales Increase

(Special Akron Correspondence)

Sales of the Mason Tire & Rubber Co. are showing a great increase this year, according to a statement issued by D. M. Mason, treasurer of the company. For the first quarter ending April 30, sales totalled $2,140,812, an increase of over 100 per cent over the same period last year.

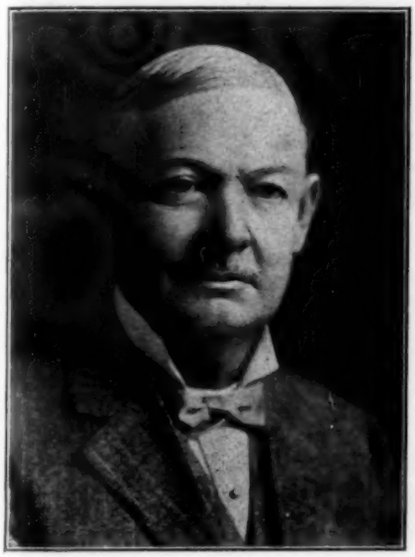
Personnel Changes in the Industry

Edwin C. McGraw Passes Away—Hannibal Rubber Chooses Directors—India Adds to Organization—New Officers for Premier Rubber—Morgan President of McGraw—Gunsaulus Transferred to Detroit

Edwin C. McGraw Passes Away

Edwin C. McGraw, sixty-one years of age, founder and president of the McGraw Tire & Rubber Co., of East Palestine, Ohio., died at his summmer home, Point View, Miami, Fla., on May 24, following an illness of several months duration.

The greater part of his life was spent in and around Pittsburgh, Pa., where he was the senior member of the firm of J. A. McGraw Bros., pioneers in the rubber composition roofing manufacture. He founded the McGraw Tire & Rubber



EDWIN C. MCGRAW

Co., and until failing health forced him to relinquish his duties was actively engaged in the business. He was also president of the Fidelity Trust & Mortgage Co., and a director in the Fidelity Bank & Trust Co., both at Miami. He is survived by his wife, Lenore H. Wiefe McGraw, one son, Robert W. and a daughter, Mrs. John Morgan of East Palestine, and a brother, George A. McGraw, Philadelphia, Pa.

Hannibal Rubber Chooses Directors

The first stockholders meeting of the Hannibal Rubber Company of Hannibal, Mo., was held recently and a board of directors was named. The following men compose the board: C. O. Mayes, S. O. Osterhout, R. B. Goodson, D. D. Mahan, W. J. Richards, A. E. Gibson, C. C. Haywood of Shelbina; W. G. White of Whiteside and H. M. Still of Kirksville.

A meeting of the board of directors was also held in the Trust Company building and the officers of the company will more than likely be named in the near future.

The building in which the rubber company will be located is now being erected at the foot of South Maple avenue and Collier street and will more than likely be ready for occupancy the latter part of this month.

The company was recently incorporated under the state laws of Missouri for $1,000,000.

India Adds to Sales Organization

In line with its announced plan calling for important additions to its selling organization in the field, the India Tire & Rubber Co., of Akron, has recently announced the following new appointments:

W. W. Alexander, for several years a well known person in the tire selling world, has been named direct factory representative in the new England territory with headquarters in Boston. Mr. Alexander is especially well acquainted with the New England trade through his long association with the Diamond Rubber Co. in the early days of the industry. He comes to India from the Dayton Tire Co.

To Blakey & Hall, of Pittsburgh, Pa., has been assigned the India distribution for Pittsburgh and adjacent territory. The company stands high among Pittsburgh's leading tire distributors, having built up an extraordinarily large volume of business during the last few years. Mr. Hall, a member of the firm, was for a long time connected with one of Pittsburgh's leading newspapers.

Frank G. Schenuit, a popular tire man in Baltimore, has been given distribution rights for Baltimore and surrounding territory. He has a wide business acquaintance all through that district and those who know him best predict big things for India during the coming months.

New Officers for Premier Rubber

Capital stock of the Premier Rubber and Insulation Company of Dayton, Ohio, has been increased from $150,000 to $250,000, officials of the company announced. At a recent meeting of stockholders William Grethers was elected president and treasurer; William F. Greiser, vice-president; John H. Shively, secretary, who with Joseph Westendorf and Harry G. Grestner will comprise the board of directors.

Increase in capital stock was necessitated ,directors of the concern say, because of need for additional capital to handle a greatly increased volume of business which recently was obtained.

Two large buildings at Edmund street and B. & O. railroad are occupied by the Premier company and forces are working night and day to meet the demand for hard rubber products in which the company specializes.

Morgan President of McGraw

At a special meeting of the Board of Directors of the McGraw Tire & Rubber Company, held at its offices East Palestine, Ohio, on June 5, John Morgan, formerly vice-president and treasurer was unanimously elected to the presidency, succeeding the late Edwin C. McGraw, founder of the company, who died at his southern home, Miami, Fla., on May 24. Mr. Morgan will also continue to serve as treasurer. Mr. Morgan's association with the McGraw Company extends over the past ten years; covering substantially its inception. Throughout this decade he has taken active part in the direction of the company's policies, having been elected to the treasurership in 1912 and in the following year to the vice-presidency and treasurership.

He was born in London, England in 1880, and in 1905 came to America where

JOHN MORGAN

he introduced the Kempshall, a high grade European tire, into the United States. He is one of the directors of the Rubber Association of America, and is widely known in automotive circles.

Charles H. Wheeler, factory manager of the McGraw Tire & Rubber Company was also elected to serve on the Board of Directors.

Gunsaulus Transferred to Detroit

P. M. Gunsaulus, formerly manager of the Firestone Ship by Truck Bureau in Minneapolis has been appointed manager of the Firestone bureau in Detroit. Detroit, the truck manufacturing center, is considered the most important post in the country along Ship by Truck lines.

When the Firestone Ship by Truck Bureau was opened in Minneapolis in May 1919, Mr. Gunsaulus, who was formerly sales promotion manager for Firestone at Minneapolis, was placed in charge. He is given credit for organizing the Rural Motor Truck Terminals in Minneapolis and St. Paul, the first and most successful truck line freight stations to be established in the United States.

Credit Convention of M. & A. M. A.

The 1920 Credit Convention of the Motor and Accessory Manufacturers Association, has been tentatively scheduled for Thursday and Friday, September 16th and 17th, at Cleveland, Ohio.

In view of the vital problems affecting the automobile industry, in relation to the general financial and credit conditions, it is believed that this year's Credit Convention will be one of the most interesting and most important in the history of the Association.

As usual, the credit managers and executives of the various companies belonging to the Association—the principal manufacturers of parts, tires, accessories and equipment for the automotive industry—will gather at this meeting, not only to discuss technical credits subjects, but to review general credit conditions in the industry, and exchange viewpoints and experiences on special problems. The outlook in the passenger-car and motor-truck fields will undoubtedly receive special consideration.

French Seek Patent Rights

An offer of $150,000 for the patent rights to manufacture U. S. Compression inner tubes in France has been made to the Tulsa, Okla., corporation, according to a letter received recently by the local organization from A. J. Liebman, president of the Compression Tube and Tire Corporation, of New York, distributors of the tubes in the East.

It was announced by officials of the Tulsa Rubber Company, which has constructed a million-dollar factory on the Sand Springs line, that the offer to purchase the patent came from a syndicate of French capitalists who plan to build a factory to manufacture the tubes in France if the sale is consumated.

New Market for Dirigibles

(Special Akron Correspondence)

The Goodyear Tire & Rubber Co. may develop a new market for the dirigibles it is manufacturing at its Akron factories. According to a dispatch from Los Angeles, several motion picture companies are considering purchases of the lighter-than-air craft for use in making films. One company which turns out popular comedies, may be the first purchaser, it is said.

New United States Tire

A new big single solid tire for heavy duty trucks carrying up to six tons to a wheel has been announced by the United States Tire Company. The most interesting features of the tire are that its design insures the elimination of the chief cause of internal friction, provides for the dissipation of frictional heat and also makes possible an excellent vulcanization of all parts of the rubber.

The tire has been placed on the market after a long series of gruelling road and laboratory tests at the company's truck tire plant at Providence and will be made in sizes from seven to fourteen inches.

The new tire, known as the Monotwin, has solved all of these various problems effectively. Big trucks equipped with them can travel at good rates of speed without danger of ruining the tires.

The Monotwin is a huge single with an especially massive rubber body. Deep depressions occur at regular intervals in the center of the tire.

The new tire is made from the grainless rubber which is a distinctive feature of all the solid tires made by the company.

Especial additional advantages are claimed for the Monotwin. The alternative cross bars and depressions give the tire a non-skid quality. The bottoms of the depressions go down deep into the heart of the center of the tire and below the point where the tire is worn to the limit of its serviceability. Consequently, the tire retains its distinctive qualities throughout its life, and does not require

MONOTWIN SOLID TIRE

any additional attention, such as regrooving. The shape of the depressions is such that stones and other foreign matter cannot lodge in them.

The contour of the wearing surface of the tire and of the depressions is such that, as the tire wears down, more and so that the load carrying capacity is uniform throughout the life of the tire. Moreover, the composite nature of the tire makes possible its use either as a wide single or in place of duals.

Safety Appliances on Display

Acting on the theory that a man is particularly susceptible to safety suggestions after receiving an injury, the Lynn Massachusetts, works of the General Electric Company have placed in the plant medical department a case showing some of the safety articles recommended for use of employes. This case has an open front so that the physician may readily take down any exhibit and explain its use to the employe.

Goodyear Opens California Plant

The new twenty million dollar plant of the Goodyear Tire & Rubber Co. at Los Angeles, Cal., started operations on June 1 with a force of 500 employes, 275 of whom are from Akron. Three thousand more employes will begin work June 15 when the formal opening of the big plant will be held

Formal opening ceremonies will include a parade and numerous speeches by city and Goodyear officials.

Original plans had been made to stage the formal opening on June 1 but a delay in the arrival of equipment, due to the railroad tieup, caused the change in plans.

Work of constructing the buildings and installing the machinery has been pushed day and night by a force of more than 2000 men.

The cotton mill, which starts operations along with the tire plant, is designed to supply the cotton for cord and fabric tires. It gets its supply of cotton from Goodyear's 28,000-acre plantations in the Salt River Valley, of Arizona, and the 100,000-acre ranch recently purchased in the Imperial Valley, of California. An additional supply will be obtained from individual farmers in Southern California and Arizona who are under contract.

Work is being pushed in completing the Goodyear housing project in Goodyear Gardens, adjoining the new plant. While more than a hundred homes are already occupied, the demand is far greater then the contractors have been able to supply. In addition to the houses, two large apartments have been completed and are being occupied by Goodyear employes.

Beautifying of Goodyear Gardens is under way. Thousands of trees, shrubs and gardens are to fill the yards of these homes and line the streets. It is the claim of the landscape architects that it will be the most beautiful industrial home districts in the country when it is complete. The homes are being sold to Goodyear workers on the installment plan.

Efforts are being made to have the athletic field in readiness for baseball within the next few weeks.

The air field also is nearing completion. One hangar already holds a dirigible while others are being rushed. It is the plan of Goodyear officials to make the Los Angeles field the greatest heavier-than-air field in the world. The climatic conditions here are considered ideal. Airlines to various points in Southern California are being planned.

Oak Rubber Rebuilds

The Oak Rubber Co., of Ravenna, Ohio, is erecting new buildings on the site of its former plant, destroyed by fire on the night of March 17.

The one story work shop will be completed in the near future and work on the two-story main factory buildings will be in progress in the immediate future.

The workshop has floor space of 60 x 170 and the main factory building will be 60 x 180.

MARKETS

Manufactured Rubber Goods

New York, June 7, 1920

Transportation is still a matter of primary importance in the manufacturing line. The Interstate Commerce Commission has taken hold of the situation in an effort to clear the congestion on the railroads, and is forcing the quick moving of all freight now held on the railroads. Considerable effort has been made by certain industries to have the Commission restore the "priorities" system in use during the war, but up to the present time no definite action has been taken along these lines, although efforts have centered on the expediting of foodstuffs in transit. The manufacturing trade all over the country, the rubber trade included, is suffering considerably from the present conditions as supplies of raw materials are being greatly curtailed. The larger rubber manfacturing companies have sufficient reserve supplies of raw materials to carry them over such emergencies as the present one, while the smaller companies are not in such good condition. These smaller interests are being more directly affected by the freight tie-up.

Despite all of these unfavorable conditions the industry continues to forge steadily ahead. Despite the rising costs of manufacture, and the dire predictions that motoring will be greatly curtailed this summer by high gasoline costs, etc., the tire manufacturers are still enlarging their facilities and establishing new plants, and doing all this in the consciousness that no temporary set-backs can stop the steady growth of the industry.

AUTOMOBILE TIRES

No further price changes of importance have been reported and present price schedules remain unchanged. Smaller tire manufacturers are being forced to curtail their production due to their inability to obtain needed supplies of raw materials. There is a steady consummer, and the dealers report a good channels, the sale of tires not having been affected to any appreciable extent as yet by the high cost of gasoline. According to reports from tire dealers, the current season will be a big touring summer, and the dealers report a good buying movement, particularly on the higher grades. There is also a good demand for tubes.

MECHANICAL GOODS

The railroads are still short of rubber mechanical appliances, particularly couplings and hose, but as yet there has been no general buying for replacements. There is, however, a better demand for such appliances and some car manufacturers are buying hose and couplings for the thousands of new freight, coal, and passenger cars now under construction. A steady inquiry for marine specialities is also reported, demand for these articles having improved considerably in the past few years as the American merchant marine has been constantly expanded and enlarged. Demand for rubber belting and packing is reported as being fair along routine lines.

BOOTS AND SHOES

With summer weather at last at hand, there is a greatly accelerated demand for rubber heels coming in from the repairing trade, and wholesalers are doing a record volume of this kind of business. Rubber soled footwear is also meeting with a good demand, canvas topped rubber soled shoes meeting with popular favor this season because of the high prices ruling on other sport footgear. Fibre soles manufactured by the rubber companies are selling in constantly increasing volume as the high level of sole leather prices continues. Some export inquiry for the combination soles is reported.

MISCELLANEOUS

The manufacture of rubber specialities is constantly expanding. Activity in this field was greatly curtailed during the war by the ban on non-essential industries, so-called, but operations are now going on on a large scale. Rubber appliances for autos, such as foot pads, step matting, and brake pads are finding much favor with motorists, and new lines are constantly appearing on the market.

Cottons, Yarns, and Fabrics

New York, June 8, 1920

The market has eased off generally during the past few weeks on spot and nearby delivery cotton, closing quotations on Saturday being lower than those of a fortnight ago. Futures are a trifle steadier, however. The market has been forced down partly by the tight condition of the money market. This condition and the raising of interest rates by the Federal Reserve Board have tended to restrict trading on the spot position. Had the tightening of credits come in the middle of the season, while the new crop was being moved, leading interests in the market believe that a heavy smash would have been inevitable.

SEA ISLAND COTTONS

Conditions have shown no appreciable change in the market for Sea Island cotton during the past fortnight. Prices quoted in Southern spot markets still show some variation, according to seller, prices ranging from $1.15 to $1.18 per pound on average staple, with high prices in proportion on the extra grades. There is little offering of any desirable grade, however, supplies having been sold up some time ago. Prospects for the new crop are very uncertain, and present indications point to another short yield.

AMERICAN-EGYPTIAN COTTON

Cotton producers in the Salt River and other growing sections of the Southwest are making plans for greatly enlarging their acreage during the coming season, and the output is expected to show a sharp increase when the new crop is gathered. Production during the past season was about 42,374 bales, but it is expected that the yield will be almost tripled this season due to increased acreage. Spinners of tire fabrics are contracting for the new crop, some of which will be manufactured into tire fabrics in the west, instead of being brought to the East and spun in New England plants.

EGYPTIAN COTTON

Uncertainty as to the probable acreage of the new crop of Egyptian cotton is being noted. Advices received by American firms were to the effect that a large planting might be looked for, but British advices tend to give an opposite view. Liverpool advices state that the Advisory Committee in Egypt has expressed the desire that the acreage for the coming cotton crop should be curtailed to about 33 1-3 per cent of the available acreage, and that the remaining land be devoted to the production of foodstuffs. Egyptian interests are against this plan, however, holding that Australia and India will produce bumper crops of grain much of which will be exportable to Egypt. In the spot situation, little activity is to be noted, the usual between-seasons dullness prevailing in most quarters.

TIRE FABRICS

The market is a complex affair. To quote one market authority, spot tire fabrics are "scarcer than hen's teeth" and prices on contract business are not divulged in all instances. Prices given

below, however, are those ruling on the last known transactions in the market, but are not guaranteed, inasmuch as quotations made in the market at the present time are based on conditions peculiar to each sale, such as high cost of transportation, extra labor costs, etc. There has been much difficulty experienced in the industry due to the freight tie-up, and shipments have been reduced somewhat. Egyptian cotton normally taken to Fall River from Boston by freight train has been shipped this season in large quantities by boat.

HOSE AND BELTING FABRICS

There is a strong market ruling on hose and belting fabrics under restricted offerings. Single filling ducks are firmly held at 36 to 40 cents per yard, with double filling held firm at 40 cents per yard. Enameling ducks strong and steady at 95 cents per pound, with added freight and added charges according to width; shoe ducks 90 cents to 92 cents per pound on the resale market, hose and belting ducks unchanged at 78 to 82 cents per pound.

DRILLS SHEETINGS, AND OSNABURGS

Manufacturers have been swamped with a flood of contract cancellations, and sales of piece goods at the Fall River mills have fallen off to about 50,000 pieces weekly, a curtailment of 170,000 pieces weekly. Manufacturers have stated definitely, however, that they are not in a position which will enable them to make any price reductions and are warning present holders of stocks that they will not be able to make replacements on the basis of present selling prices. Despite this warning, offerings of goods at quoted prices continue fairly liberal, many holders shading prices in order to effect a quick disposal of their goods and turn present holdings into much-needed cash.

BURLAPS

The market is weakly held on the spot position, and prices vary according to the holder. While importers are holding the market steady on most lines, buyers report that they can beat quoted prices to some extent on firm lines. The light-weight goods are showing some strength, however.

TIRE FABRICS

17¼-ounce Sea Island, combed, sq. yd.		Nominal
17¼-ounce Egyptian, combed		2.35@2.50
17¼-ounce Egyptian, carded		2.25@2.40
17¼-ounce Peelers, carded		Nominal
17¼-ounce Peelers, combed		2.25@2.35

DUCKS

Belting (pound basis)	lb.	.78½ @	.82
Hose (pound basis)		.78½ @	.82
Enameling		.95 @	—
Shoe Ducks		.90 @	.92
Single filing	yd.	.36 @	.40
Double filing		.40 @	—

DRILLS

37-inch 2.35-yard	yd.	.32 @	—
37-inch 2.75-yard		.27½ @	.28
37-inch 3.00-yard		.26½ @	—
37-inch 3.25-yard		.25½ @	—
37-inch 3.50-yard		.26 @	—
37-inch 3.95-yard		.21 @	—
37-inch 2.00-yard	Northern	Nominal	
40-inch 2.40-yard	Southern	Nominal	
40-inch 2.40-yard	Northern	Nominal	
52-inch 1.90-yard	Southern	Nominal	
52-inch 1.90-yard	Northern	Nominal	

SHEETINGS

40-inch 2.35-yard	yd.	— @	—
40-inch 2.50-yard		.34 @	—
40-inch 2.85-yard		.30 @	—
40-inch 3.00-yard		.28 @	—
40-inch 3.25-yard		— ½	—
40-inch 3.75-yard		.26 @	.27
40-inch 3.60-yard		.28 @	.29
40-inch 4.25-yard		.23½ @	—

Note—In view of the unsettled conditions prevailing in the market at the present time, the prices quoted above are more or less nominal, and are not guaranteed.

BURLAPS
(Carload Lots)

	Cents	Per	Yard
7 -ounce 40-inch	——	@	——
7½-ounce 40-inch	——	@	——
7½-ounce 45-inch	——	@	——
10 -ounce 36-inch	——	@	——
10 -ounce 40-inch	13.00	@	13.25
10 -ounce 45-inch	Nominal		
10½-ounce 40-inch	11.50	@	11.75

Chemicals and Compounding Materials

New York, June 7, 1920

Continued price fluctuations are to be noted in this market, but for the first time in a considerable period, it is noted that most of the price changes during the fortnight under review were downward ones. This has led many to believe that the peak of high prices has been passed, but it is too soon to be definitely known whether or not such is the case, although all of the evidence would seem to justify such a belief.

BENZOL AND OTHER CRUDES

Prices hold firm under a continued shortage in the supply, producers maintaining the market firm on the basis of 28 cents per gallon for ninety per cent, while pure is held at 30 cents per gallon. Phenol continues quiet and nominally unchanged at 12 cents per pound. Toluol in very light supply, and firm at 31 to 35 cents per gallon. Xylol holds unchanged at 35 cents per gallon for commercial and 40 cents for the pure.

LITHARGE

Demand for litharge continues heavy, and producers are having difficulty in filling all the orders they are accepting. Car shortage is hampering distribution to some extent. Nothing has yet been done in the way of advancing prices, and the market on American powdered in casks holds unchanged at 11¾ to 12¼ cents per pound, with the market held at 15½ cents in 100 pound kegs for 500 pounds or less.

LITHOPONE

Producers are not in a position to accept all the business offered at the present time, the market being tied up due to the inability of the shippers to obtain freight cars at producing points. Most of the producers have adopted the policy of taking care of their established trade, and are consequently unable to book all of the future business offered them. The spot market is virtually bare. The price in carlot lots holds unchanged at 8 cents per pound.

WHITING

Although imports of English chalk are increasing right along, the volume is not yet sufficient to permit of the free manufacture of whiting, and manufacturers are consequently unable to produce sufficient to take care of the requirements of the trade. Prices hold steady at $1.40 for the commercial, $1.45 for gilders' bolted, $1.55 for extra gilders' bolted.

BARYTES

Prices on barytes continue withdrawn, producers being unable to take on any additional business while the market remains in its present state. Inability to obtain sufficient supplies of coal, and to make shipment of the barytes after production is keeping the producers behind in their contract deliveries, but some improvement is reported according to reports from the West, and producers hope soon to be in a position which will allow them to resume quoting prices and booking further business.

DRY COLORS

Price declines have not yet touched this market to any appreciable extent, and the market is holding steady on most lines. The tire trade has been a consistent buyer of blacks during the past few weeks, and with sales to the paint trade also active, prices are firm. Blues hold firm in the main, with the market quiet. Browns are firmly held, with resales being made at over the quoted prices in the producing market. Greens and reds hold steady, with particular activity noted, and yellows are nominally unchanged.

INTERMEDIATES

Aniline oil is strong on the basis of 34 cents per pound, while the market for aniline salts is weaker, prices dropping to 39 cents. Benzidine is also quoted lower at $1.30 per pound for base, and $1.10 for sulphate. Beta napthol quiet and weaker. Dimethyaniline continues to decline, prices being held at $1.35 per pound. Dinitrobenzol is an exception to the weakness ruling in the market, showing a strong tone at 32 to 35 cents per pound. Nitrobenzol is higher at 14½ cents per pound, in large quantities, prices having been advanced due to shortage of raw materials. Paranitraniline is tending lower, spot sales having been made down to $1.58, with future delivery reported sold down to $1.52. Paraphenylenediamine holds quiet and unchanged on the quoted basis.

MISCELLANEOUS

Zinc oxide holds strong under light offerings. The market for turpentine has gone into a slump, after having risen to record heights, and holders are now pressing for sale at $1.95 per gallon, with few takers. The market for glue held quotably unchanged, spot supplies being low due to inability of dealers to replenish stocks because of difficulties in getting through freight shipments. Orange mineral quiet and unchanged. Casein strong and unchanged at 16 to 18 cents per pound. Blanc fixe so closely sold up that producers are refusing further business.

Current Prices for Chemicals, Fillers, Colors, etc.

Acetone, carlots	lb.	.21 @	.22
smaller lots	lb.	.22 @	.23
Acetanilid, C. P., bbls.	lb.	.70 @	.75
Acids, Acetic, 56 per ct.	cwt.	8.40 @	9.15
Carbolic, C. P.	lb.	.12 @	.20
Muriatic, 20 deg.	cwt.	2.25 @	2.50
Muriatic, 22 deg.	cwt.	3.00 @	3.25
Nitric, 42 deg.	cwt.	7.50 @	8.00
Nitric, 40 deg.	cwt.	7.00 @	7.25
Sulphuric, 60 deg. car lots	tons	19.00 @	21.00
Sulphuric, 60 deg. car boys		— @	—
Tartaric, crystals	lb.	.78½ @	.79
Aluminum, Silicate		Nominal	

Aniline oil, bulk basis, Contract	—	@	—
Imported	Nominal		
Domestic	.34	@	.35
Antimony—			
Oxide ..lb.	.13½	@	.14
Sulphuret, red ..lb.	.19	@	.20
Sulphuret, golden ..lb.	.20	@	.22
Sulphuret, crimson..lb.	.38	@	.40
Alcohol, denatured, 190 proof	1.08	@	1.12
Wood, 95 per ct.	2.65	@	2.70
Ethyl, 190 proof	Nominal		
Aldehyde Ammonia	Nominal		
Ammonia, powdered	.17	@	.17½
Ammonium Carbonate, domestic ..lb.	.16	@	.16½
Amyl Acetate ..gal.	4.70	@	4.80
Anthracene, 80 per ct.	.95	@	1.00
Anthroquinine, 95 per ct.	4.25	@	5.00
Asbestine	Nominal		
Asphaltum, Egyptian ..lb.	.30	@	—
Domestic ..ton	.30	@	.40
Barium, dust	—	@	—
Sulphide ..lb.	.07¼	@	.07½
Barytes, prime white imported ..ton	Not quoted		
white, domestic..ton	Not quoted		
off-color, domestic ..lb.	Not quoted		
Southern, f.o.b. mills..	Not quoted		
Western, f.o.b mills...	Not quoted		
Beeswax	.28	@	.65
Banzidine Base ..lb.	1.30	@	1.40
Benzol, 90 per ct. ..gal.	.28	@	.30
Benzol, pure bulk, 100	.30	@	.35
Blanc Fixe, dry, bbls..lb.	.05½	@	—
Burgundy Pitch, dom..lb.	.08	@	.10
Foreign	.60	@	.65
Blacks, Drop ..lb.	.05½	@	.15
Ivory ..lb.	.16	@	.30
Carbon, gas, cases..lb.	.15	@	.30
Lampblack R M..lb.	.15	@	.45
Mineral blacks ..ton	35.00	@	45.00
Blues, Prussian	1.00	@	—
Soluble ..lb.	1.00	@	—
Ultramarine ..lb.	.15	@	.50
Browns, Umber, Turkey, burnt powdered ..lb.	.05½	@	.07
American, burnt ..lb.	.04½	@	.06
Cadmium, sulphide, yellow lb.	1.75	@	2.00
Carbon Disulphide, bulk..lb.	—	@	—
Bisulphide ..lb.	.07½	@	.08
Casein, C. P. ..lb.	.35	@	.36
Castor Oil	.19	@	.22
Caustic Soda, 76 per ct..cwt.	6.25	@	6.35
Chalk, precipitated, extra light ..lb.	.05½	@	.06
heavy ..lb.	.04½	@	.05
China clay, domestic ..ton	8.50	@	20.00
imported ..ton	18.00	@	23.50
China Wood Oil, bbls..lb.	.22	@	—
F.o.b. Pacific Coast..	.18½	@	.19¼
Chloroform, U. S. P.	.40	@	.45
Coal Tar Pitch	—	@	—
Cottonseed Oil, crude f.o.b. mills ..lb.	16.00	@	—
Prime summer yellow ..bbls.	18.00	@	—
Dimethylaniline ..lb.	1.35	@	1.50
Elateron	—	@	—
Formaldehyde, spot ..lb.	.57	@	.62
Fullers Earth, powd., 100 lbs.	1.50	@	2.00
Fossil flour ..lb.	.03¾	@	.05
Genasco Mineral Rubber..	—	@	—
Gilsonite ..ton	55.00	@	65.00
Glue, extra white ..lb.	.35	@	.45
medium ..lb.	.30	@	.35
low grade	.20	@	.25
foot stock	.16	@	.20
brown foots	.16	@	.20
common bone	.16	@	.20
Glycerine, C. P. (drums) lb.	.27	@	.27½
cans	.28	@	28½
Graphite, flake (bbl.)..lb.	.14	@	.25
powdered (bbl.) ..lb.	.05	@	.10
Green, chrome, R. M..lb.	.42	@	.71
Ground glass (fine) ..lb.	.03½	@	.04
Hexamethylene ..lb.	Nominal		
Infusorial earth, powd'd..lb.	.02	@	.035
bolted ..lb.	.035	@	—
Iron oxide, red, reduced grades ..lb.	.13	@	.15
red, pure, bright..lb.	—	@	—
Hexamethyenetetramine ..lb.	Nominal		
Kaolin	—	@	—
Lime, hydrated	—	@	—
Lead, red, dry (casks)..lb.	.12¼	@	.12½
sublimed ..lb.	—	@	—
white, basic carb..lb.	.10½	@	.11
white, basic sulp..lb.	.10	@	.10¼
Lime flour ..lb.	.01¾	@	.02
Litharge (casks) ..lb.	.11¾	@	.12¼
English ..lb.	—	@	—
Lithopone, domestic, bbls..lbs	.08	@	.08¼
in bags ..lb.	.07¾	@	—
M. R. X.	—	@	—
Magnesia, carbonate ..lb.	.17	@	.21
calcined light ..lb.	.60	@	.65
Magnesite, calcined, pwd.ton	50.00	@	65.00
Magnesia Oxide, heavy	—	@	—
Light	—	@	—
Extra light	—	@	—
Napthalene ..lb.	.15	@	.17
Nahthabenzol	.14½	@	.16
Naphtha, motor gasoline, (steel bbls.) ..gal.	.30	@	—
68 @ 70 degrees (steel bbls.) ..gal.	.37	@	—
70 @ 72 degrees (steel bbls.) ..gal.	.38	@	—
73 @ 76 degrees (steel bbls.) ..gal.	.40	@	—
machine(steel bbls.)gal.	.47½	@	—
Oil corn crude factory..cwt.	17.50	@	17.81
corn, ref. bbls.)..cwt.	20.56	@	—
linseed (bbls.)	1.70	@	1.75
in carloads, spot	1.60	@	1.67
tank cars	1.60	@	1.67
Oil palm, Lagos ..lb.	.12	@	—
Niger	.11¼	@	—
pine, yellow ..gal.	1.00	@	—
distilled ..gal.	1.25	@	1.35
rapeseed, refined ..gal.	1.70	@	—
rapeseed ,blown..gal.	1.64	@	—
rosin, first rectified.gal.	.89	@	—
second run	.92	@	—
tar (commercial) ..gal.	.36	@	.38
Oleum Acid, 20 per ct..ton	29.00	@	35.00
Orange mineral, Amer..lb.	.15½	@	.16½
imported ..lb.	—	@	—
Ozokerite	.35	@	.36
Paraphenylenediamine ..lb.	2.70	@	2.85
Petrolatum, bbls., amber.lb.	.06	@	.07
pale yellow ..lb.	.06½	@	.07
Paranitrosodimethylanaline .	3.50	@	4.00
Parafin, refined, 118 @ 120 m. p.	.12	@	—
127 @ 129 m. p.	.11	@	—
137 @ 140 m. p.	.12½	@	—
Phenol	.12	@	.25
Pumis	.05	@	.10
Pine tar kiln ..bbl.	14.50	@	—
Pitch ..bbl.	8.50	@	—
Plaster of paris ..bbl.	2.00	@	3.00
Red Tuscan ..lb.	.22	@	.30
red (American) ..lb.	.14	@	.16
Indian (English) ..lb.	.14	@	.16
Standard ..lb.	—	@	—
Rosin (common to good)— 28 lbs.	19.50	@	—
Rotten stone, powdered..lb.	.02½	@	.04½
Rubber, substitute, black..lb.	.13	@	.17
white ..lb.	.1.	@	.24
brown ..lb.	.20	@	.25
Rosin Oil, first rectified.	.89	@	—
Second rectified	.92	@	—
Third rectified	1.10	@	—
Fourth rectified	1.14	@	—
Soda ash, light, 58 per ct.cwt	3.40	@	3.50
Sodium Nitrite ..lb.	.24	@	—
Solvent Naphtha, crude,heavy	.25	@	.30½
Soya bean Oil, bbls..lb	Nominal		
Sellers, tanks, f. o. b. coast	.13½	@	.14
Stearic Acid, single	.25	@	—
Shellac, fine orange ..lb.	Nominal		
Sulphur Chloride, drums..	.06½	@	.16
T. N. ..lb.	1.05	@	1.10
Bleached ordinary .lb.	1.10	@	1.20
Bleached, bonedry..lb.	1.20	@	1.30
Silex (silicia) ..ton	25.00	@	40.00
Soapstone, powdered..ton	12.00	@	17.50
Starch, corn, powd..cwt.	5.98	@	6.23
pearl	4.97	@	5.19
Jap, potato, duty pd, lb.	.09½	@	—
Sulphur, crude ..ton	—	@	—
100 pounds	—	@	—
roll	3.20	@	—
commercial superfine..	2.00	@	2.25
Talc, American ..ton	25.00	@	40.00
French ..ton	Nominal		
Thiocarbanilid	—	@	—
Toluol, pure, in drums.gal.	.31	@	.35
commercial	.30	@	.32
Tripolite earth ..lb.	.01½	@	—
Turpentine, pure gum— spirit ..gal.	1.95	@	—
wood ..gal.	Nominal		
Venice, artificial ..gal.	.15	@	.16
true	Nominal		
Vermilion, English ..lb.	1.60	@	1.65
American	.25	@	.30
Vorite	Nominal		
Wax, beeswax, crude yel.lb.	.29	@	.30
refined	.35	@	.37
Bayberry	.37	@	.39
ceresin, white ..lb.	.15	@	.16
yellow	.14	@	.15
Whiting, commercial ..cwt.	1.40	@	—
Gilders Bolted	1.45	@	—
Paris white, Amer..cwt.	1.75	@	—
English cliffstone..cwt.	2.00	@	—
Xylol (gal.), pure	.42	@	.47
Commercial	.33	@	.37
Zinc Oxide, French process, red seal	.11½	@	.11¾
green seal	.12½	@	.12¾
white seal	.13½	@	.13¾
Leaded Grades—			
Commercial, lead free	.09½	@	.10
5 per ct. lead sulphate.	.09	@	.09¼
10 per ct. lead sulphate	.08¾	@	.09¼
20 per ct. lead sulphate	.08½	@	.09
35 per ct. lead sulphate	.08¼	@	.09⅛
Zinc sulphate	.03½	@	.04¼

Crude Rubber

New York, June 7, 1920

No improvement in the position of the spot market is to be seen, and prices are weakly held. While the prevailing congestion on the freight lines of the country continues consumers of crude rubber are not buying any stocks and the market is consequently further weakened by this lack of buying support. Transactions in the local trade are principally between jobbers and importers. There are some distress lots making their appearance from time to time, but these are usually quickly absorbed.

Importers are holding the market for forward delivery on a firm basis, however, despite the weakness on spot. Up-river medium is offering for prompt shipment at 37 to 38 cents per pound, with up-river coarse at 29 to 30 cents, both one cent lower than at the close of last month. Both Islands fine and coarse have also shown appreciable declines during this period.

	Cents per Pound.		
Para—Up-river fine	.39	@	.39½
Up-river medium	.37	@	.38
Up-river coarse	.29	@	.30
Caucho ball	.31	@	—
Islands fine	.38	@	.39
Islands coarse	.21½	@	.22
Cameta	.21½	@	—
Ceylon—Smoked sheets, ribbed..	.38½	@	.39½
Smoked sheets, plain	.37½	@	.38
Maderia, fine	.43	@	.44
Knapsack	—	@	—
First latex pale crepe	.38½	@	—
Amber Crepe	—	@	—
No. 1	.39	@	.40
No. 2	.38	@	.39
No. 3	.37	@	.38
Clean brown crepe	—	@	—
Rio Nunez string	.55	@	—
Palembang	.13	@	.13½
African	.33	@	—
Prime Surinam sheets	.84	@	—
Centrals—Corinto prime	.29	@	.29½
Esmeralda, prime	.28½	@	.29
*Balata, sheets	—	@	—
Guayule, wet	.27	@	.28
Balata, block, Panama	—	@	—

*Nominal

Scrap Rubber

New York, June 7, 1920

Trading has remained generally quiet during the past fortnight, and buying has been restricted to small quantities in most instances. Out of town reclaimers are showing but little interest in the market at the present time, being unwilling to buy when they are not sure of delivery of the goods, due to the numerous embargoes which are still holding up the movement of freight.

These conditions have had the inevitable result of weakening the market on spot, as fresh supplies are constantly accumulating. Some distress offerings have been heard of at prices slightly under the market, but holders in general are maintaining their prices on the basis quoted below.

	Cents per Pound.		
Boots and shoes	7.00	@	7.25
Arctics, trimmed	5.50	@	5.75
Arctics, untrimmed	5.00	@	....
Tires—Automobile	3.25	@	3.50
Bicycles, pneumatic	2.50	@	3.00
Mixed hose	1.50	@	1.75
Air brake	....	@	....
Inner tubes, No. 1	14.50	@	17.50
Inner tubes, No. 2	9.00	@	10.00
Red tubes	8.25	@	8.50

American Rubber Patents

ISSUED MAY 18, 1920

1,340,339—To Joseph H. Hill, Wilmington, Del. Tire.

1,340,341—To Halbert K. Hitchcock, Pittsburgh, Pa. Sole.

1,340,556—To Max Cyrus Overman, New York, N. Y. Tire.

1,340,608—To William A. Helm, Traverse City, Mich. Tire-protector.

1,340,641—To Herbert K. Wheelock, Los Angeles, Cal., assignor by mesne assignments to the Western Vulcanizer Mfg. Co., Chicago, Ill. Vulcanizer.

1,340,642—To Herbert K. Wheelock, Los Angeles, Cal., assignor to the Western Vulcanizer Mfg. Co., Chicago, Ill. Vulcanizer.

1,340,702—To Henry Dech, Trenton, N. J. assignor to the Mercer Tire Company, Trenton, N. J. Inner tube and method of making same.

1,340,703—To Henry Dech, Trenton, N. J., assignor to the Mercer Tire Company, Trenton, N. J. Inner tube and method of and apparatus for making same.

1,340,704—To Henry Dech, Trenton, N. J., assignor to the Mercer Tire Company, Trenton, N. J. Inner tube and method of making the same.

1,340,776—To Frank L. Kryder, Akron, Ohio, and Edgar W. Snyder, Indianapolis, Ind. Apparatus for reclaiming rubber waste.

1,340,777—To Frank L. Kryder, Akron, Ohio. Process of reclaiming and regenerating rubber waste.

ISSUED MAY 25, 1920.

1,340,882—To Rufus A. Freeman, Flushing, N. Y. Method of making articles from sheet-rubber.

1,340,883—To Rufus A. Freeman, Flushing, N. Y., assignor to I. B. Kleinert Rubber Company. Method of and apporatus for making rubber articles.

1,340,884—To Rufus A. Freeman, Flushing, N. Y. Machine for making sheet-rubber articles.

1,340,965—To Thomas Alexander McAllister, Augusta, Ga. Process of vulcanizing.

1,340,973—To Charles Nordstrom, Milwaukee, Wis. Tire-vulcanizer.

1,340,984—To William H. Robinson, Brooklyn, N. Y., assignor one-half to Ernest Kendall, Brooklyn, N. Y. Vehicle-tire.

1,341,121—To Charles C. Gates, Denver, Colo., assignor to the Gates Rubber Company, Denver, Colo. Process of applying repair-tires to worn casings.

1,341,247—To Jeremiah J. Shoemaker and Charles C. Cox, Akron, Ohio. Method of manufacturing tire inner tubes.

1,341,383—To Gilbert F. Quinn, Revere, Mass. Rubber heel.

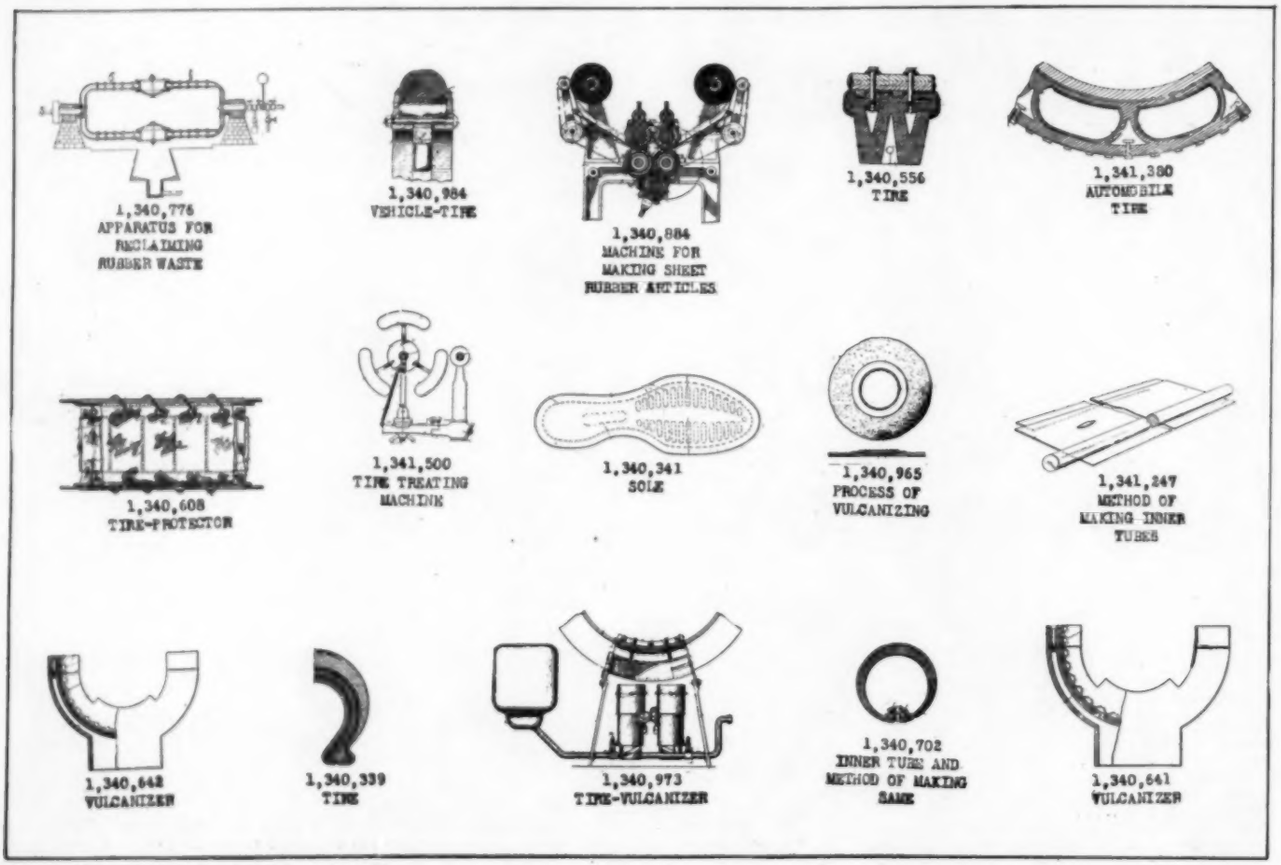
1,341,387—To George Schrade, New York, N. Y. Attachable heel.

1,341,391—To Joseph Spadafora, Cambridge, Mass. Resilient tire.

1,431,422—To Lucien Gaisman, Manchester, England, assignor one-half to Sylvian Dreyfus, Manchester, England. Guard for rubber mills.

1,341,451—To John Baptiste Abler, Guelph, Ontario, Canada. Rubber glove.

1,341,500—To Charles L. Durham, Salina, Kans. Tire-treating machine.



Cooper Hewitt Business Increases

Since control of the Cooper Hewitt Electric Company, Hoboken, N. J., was assumed last June by the General Electric Company, new business of the company has more than doubled. The plant has been running to capacity and working overtime in effort to catch up with orders.

In order to meet the increased demand for industrial lighting outfits as well as motion picture apparatus, the Cooper Hewitt Electric Company has recently purchased some adjoining property. This will eventually give more than double the present floor space.

Rapid strides have been made in the improvement and development of the Cooper Hewitt lamp, chief among which is the standardization of the new 85 per cent power factor outfit. Some radical improvements are under way which will materially increase the efficiency of this lamp.

Wellman-Seaver-Morgan Bulletins

The Wellman-Seaver-Morgan Company, of Cleveland, Ohio, has recently issued a series of bulletins showing some of the notable installations made by that company. The bulletins offer an interesting innovation in that on facing pages are shown a machine and its working blueprint. The bulletins are as follows: Bulletin No. 41—Coal and Ore Handling Machinery; Bulletin No. 42—Special Cranes; Bulletin No. 43—Hydraulic Turbines; Bulletin No. 44—Hoisting and Mining Machinery; Bulletin No. 45—Steel Works Equipment; Bulletin No. 46—Coke Oven Machinery; Bulletin No. 47—Port and Terminal Equipment; Bulletin No. 48—Rubber Machinery. The last named bulletin, devoted to rubber machinery gives illustrations and blueprints of an applying press, rubber cracker and washer, mixing mill, calender, rimming press and hydraulic press vulcanizer. Other articles are also illustrated.

New Haven Sheradizing Co. Moves

Announcement has been made by the New Haven Sheradizing Co. that it has changed its location from New Haven to 868 Windsor street, Hartford, Conn. The removal was due to lack of space in the old quarters. This has been remedied as the new plant will have a double capacity over the present output and will place the firm in a position to meet all present demands and at the same time provide for future expansion. The firm states that it will shortly be in a position to sheradize, handle and supply curved mandrels.